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FURTHER STUDIES CONCERNING THE PARTICIPATION OF THE ADRENAL CORTEX IN THE PATHOGENESIS OF ARTHRITIS

BY

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A few years ago we noted that rats chronically treated with large doses of desoxycortone acetate (D.C.A.) often develop joint lesions which exhibit the histological characteristics of rheumatic arthritis and periarthritis. Curiously, arthritides occurred only in a certain percentage of our experimental animals, although other "rheumatic" changes (e.g., a "rheumatic type" of arteritis, myocarditis, and encephalitis) were constantly present. Furthermore, even when an arthritis developed during the first weeks of treatment it tended to disappear in spite of continued D.C.A. administration; only rarely did such lesions progress towards what might be called an experimental replica of rheumatoid arthritis (Selye, Sylvester, Hall, and Leblond, 1944). In this respect the joint affliction again differed from the other manifestations of D.C.A. overdosage which tend to progress as long as a hormone excess is given.

During subsequent years we occasionally observed an acute joint swelling in D.C.A.-treated monkeys and dogs. Others pointed out that Addisonian patients may develop "rheumatic-like" joint swellings under the influence of D.C.A. overdosage (Dejean, 1947; Dejean, Mahoudeau, and Bricaire, 1947; Laroche, 1947a, 1947b). All these observations revealed that this corticoid exerts a rather specific effect upon joint structures in various species, but the production of arthritis was not constant enough to serve as the basis for systematic studies concerning its pathogenesis.

In the course of experiments planned to increase the incidence of this lesion we noted that, under the influence of D.C.A. overdosage, adrenalectomized rats developed arthritis more frequently than intact controls (Selye, Sylvester, Hall, and Leblond, 1944). This fact was subsequently confirmed on a very large experimental material by my pupil O. Hall (1946). Some actions of mineralocorticoids (such as D.C.A.) are inhibited by gluco-corticoids (such as "cortisone") (Selye, 1949a). Hence it was reasonable to assume that adrenalectomy sensitizes to the toxic effects of D.C.A. because it removes the source of endogenous gluco-corticoids and thereby predisposes to the development of a particularly unfavourable gluco-corticoid/mineralo-corticoid balance.

Several earlier observations had called our attention to the importance of this balance, inasmuch as a mineralocorticoid (D.C.A.) exhibited effects which are diametrically opposed to those of gluco-corticoids. Thus, chronic pretreatment with D.C.A. tends to cause thymus hypertrophy (Selye, 1941; Selye and Beland, 1943), while gluco-corticoids exert an opposite effect (Selye, 1946). D.C.A.-pretreated rats respond to various stress-producing agents (cold, formaldehyde injections, atropine injections, surgical trauma, exercise) with hypoglycaemia instead of the usual hyperglycaemia characteristic of the alarm reaction (Selye and Dosne, 1942); conversely, adreno-cortical extracts (rich in gluco-corticoids) increase the hyperglycaemic response to stress even in the adrenalectomized animal (Selye and Dosne, 1941). The development of shock after surgical trauma is aggravated by D.C.A. pretreatment and mitigated by corticosterone (a gluco-corticoid compound) (Selye, Dosne, Bassett, and Whittaker, 1940). It has been noted, furthermore, that the hypertension which can be elicited in sensitive patients by D.C.A. overdosage is abolished by an adrenal extract rich in gluco-corticoids (Perera and Pines, 1949).

On the basis of these and many other observations we came to the conclusion that D.C.A., when it is given in toxic concentrations, may create a "partial hypocorticoidism"; in other words, it can cause a condition in which manifestations of hypo- (decreased resistance to stress, thymus enlargement, hypoglycaemia) and hypercorticoidism (sodium retention, hypertensive disease) are simultaneously manifest. It is also noteworthy in this connexion that, although the clinical condition of Addisonian patients is improved by moderate doses of D.C.A., they are hypersensitive to the toxic effects of this steroid—presumably again because these individuals are deprived of the antagonistic gluco-corticoids (Selye, 1949a).

Quite recently Pirozynski and Akert (1949) noted that, even when no macroscopically visible arthritis develops in D.C.A.-treated rats, one consistently finds histological evidence of a "rheumatic-like" joint involvement. These authors confirmed that adrenalectomy sensitizes the rat to the production of joint lesions by D.C.A. They discovered, furthermore, that even the extra-articular manifestations of D.C.A. overdosage (such as cardiovascular and renal lesions) are aggravated by adrenalectomy, probably because the source of the protective gluco-corticoid had been removed.

Subsequently it was found that "rheumatic" changes in the heart and joints, similar to those produced by D.C.A., can also be elicited by a crude lyophilized anterior pituitary (L.A.P.) preparation, but only in the presence of the adrenals. Since adrenalectomy prevented these effects of L.A.P., it was concluded that they are largely, if not entirely, mediated through the adrenal cortex, perhaps owing to the discharge of some D.C.A.-like mineralocorticoid compounds (Selye, 1946).

In the course of our work on the general-adaptation syndrome, it became obvious that in response to a variety

of stress-producing agents (emotional tension, infections, intoxications, exposure to cold, etc.), the organism responds with an increased corticoid-hormone production. This is a useful adaptive reaction which helps to raise resistance in general (Selye, 1937). However, under abnormal conditions it may derail, perhaps because the production of gluco-corticoids cannot keep pace with the excessive elaboration of mineralo-corticoids. Under these conditions the fundamentally useful general-adaptation syndrome may itself become the principal cause of disease. The "rheumatic" and some hypertensive diseases, the so-called collagen diseases—nephrosclerosis, gout, etc.—were among the derangements interpreted as "diseases of adaptation" (Selye, 1944, 1946, 1949a).

Perhaps the most important weakness of our theory is that an increased formation of D.C.A.-like mineralo-corticoids has not been actually demonstrated (by urine or blood analysis) in patients exposed to stress or those suffering from "diseases of adaptation." There is no doubt that stress causes an increased elimination of gluco-corticoids as judged by urinary bio-assays, but a concomitant increase in the formation of mineralo-corticoids is postulated almost entirely on the basis of indirect evidence, because of the great technical difficulties involved in the determination of these latter compounds. It should be kept in mind, however, that even if the absolute amounts of mineralo-corticoids were not increased their effect could be augmented owing to sensitization (e.g., by sodium retention or renal failure), or the gluco-corticoid/mineralo-corticoid quotient may become unfavourable.

At the time of our first observations the assumption of a pathogenetic relationship between the adrenal cortex and the "rheumatic-rheumatoid type" of arthritis appeared rather far-fetched. However, this view received strong support from recent clinical observations. It was noted that adrenal-cortical extracts (Bassi and Bassi, 1946), which are notoriously rich in gluco-corticoids, and especially cortisone (Hench, Kendall, Slocum, and Polley, 1949), a typical gluco-corticoid compound, produce spectacularly beneficial effects in patients with chronic rheumatoid arthritis. It is of special interest in this connexion that purified adrenocorticotrophic hormone (A.C.T.H.) is also effective in rheumatoid arthritis (Hench, Kendall, Slocum, and Polley, 1949), since normally this compound appears to stimulate particularly the production of gluco-corticoids.

On a purely empirical basis, so-called non-specific therapeutic procedures (e.g., parenteral injection of foreign proteins or colloidal metals, blood-letting) have long been used in the therapy of rheumatoid arthritis. It is presumably due to the same mechanism that this joint lesion can improve under the influence of a variety of other non-specific stress-producing conditions, such as pregnancy, icterus, traumatic injuries, and starvation (Hench, 1949). All these are highly effective "alarming stimuli"—that is, they can produce a condition of systemic stress with the characteristic endogenous discharge of pituitary A.C.T.H. (Selye, 1946, 1949a; in the press). As we have said elsewhere, probably the most important factor in the therapeutic action of "non-specific therapy," "fever therapy," and "shock therapy" is the fact that such drastic measures stimulate defence by eliciting a general-adaptation syndrome, and, more particularly, an increased production of A.C.T.H. (Selye, 1949b; in the press). The observation that potent gluco-corticoid and A.C.T.H. preparations are especially effective in combating rheumatoid arthritis agrees with this view.

It remains to be seen why certain impure anterior pituitary preparations (e.g., L.A.P.) often produce arthritis (Selye, 1946), while pure corticotrophin tends to inhibit its development. Perhaps some principle present in the crude extracts so modifies their A.C.T.H. effect that a predominantly mineralo-corticoid discharge results in the adrenal cortex. However, there is no definite evidence to support this hypothesis, and various points of view have been expressed concerning the probable relationship between the experimental production of arthritis with certain corticoids and pituitary extracts on the one hand and its prevention with other corticoids and pure corticotrophin on the other (Pirozynski and Akert, 1949; Editorial, 1949a, 1949b).

Until quite recently the progress of our work concerning the role of hypophyseal and adreno-cortical hormones in the pathogenesis of arthritis was seriously handicapped by two technical difficulties: (1) neither D.C.A. nor L.A.P. produces arthritis with sufficient constancy to permit systematic investigations concerning the value of therapeutic measures; (2) until a few months ago only the arthritogenic preparations (D.C.A. and L.A.P.) were readily available to us at this institute.

Recently we succeeded in developing a simple technique for the consistent production of arthritic and periarthritic changes, and, having now obtained adequate amounts of the anti-arthritic hormone preparations (A.C.T.H. and cortisone), we were able to analyse further the role of the pituitary adreno-cortical system in the production and prevention of arthritis. It is upon this work that we report in the present communication.

Methods

The *experimental animals* used in this study were adult male Wistar albino or piebald rats. The *experimental arthritis* was produced by the injection of dilute formaldehyde solutions of varying concentration (see description of individual experiments) just beneath the plantar aponeurosis of the hind paws. Normally, this strong irritant produces an intense hyperaemia and oedema of the entire paw within a few minutes.

As we shall see below, the action is increased by pretreatment with D.C.A. or L.A.P. and diminished by previous administration of A.C.T.H. or cortisone. We had noted in earlier experiments that the effect of various hormones largely depends upon the sensitization or desensitization of the target organs by peripherally acting "conditioning factors." Thus, the production of nephrosclerosis or arteriosclerosis by D.C.A. depends upon the sodium content of the diet (Selye, 1949a). In the present instance, however, formaldehyde as an irritant is the actual eliciting factor, while the hormone preparations appear to act as "conditioning factors" determining the degree of response.

About 10 days after the first hyperaemic and oedematous response vanishes, a secondary more chronic type of joint reaction becomes manifest. By this time most of the oedema has subsided, but the surrounding skin remains intensely hyperaemic and the periarticular connective tissue begins to proliferate, especially in the ankle-joint region. It is somewhat unexpected that the injection of the irritant at some distance from the ankle-joint should produce a secondary response in this articulation, but numerous observations leave no doubt concerning the selective responsiveness of the ankle-joint region during the chronic indurative stage. Probably the stretching of tissues incident to the great mobility of this joint is responsible for this.

In the course of our preliminary experiments we compared the inflammatory response to a given quantity of formaldehyde in various organs—for instance, the

connective tissue surrounding large joints, the derma, loose subcutaneous connective tissue, liver, spleen, muscle, testis, etc. These experiments revealed that the intensity of the inflammatory response (especially the initial oedema and the secondary induration) differs in various regions of the body. Apparently the connective tissue surrounding the large joints has the greatest "inflammatory potential," that of the derma and the loose connective tissue coming second. Most other tissues respond only with a very slight and transitory oedema followed by actual necrosis of the parenchymatous cells, without any long-lasting secondary proliferative inflammatory response.

The chronic periarthritic indurative changes were most readily obtained in animals which received several formaldehyde injections at a few days' intervals. Although this did not lead to any abscess formation, the resulting arthritis and periarthritis in the ankle-joint became a self-maintaining chronic inflammatory process which showed little or no sign of regression for weeks after the last injection. Indeed, frequently it continued to progress after treatment had been discontinued, so that eventually the joint became enormously enlarged, stiff, and extremely painful to touch. We shall report upon the histogenesis of this lesion elsewhere; suffice it to say here that, microscopically, in the acute oedematous stage it resembled the rheumatic, in the chronic stage the rheumatoid, type of arthritis. For the sake of simplicity we shall merely refer to these changes as the acute and chronic phases of "formalin-arthritis" (see Fig. 1).

Corticotrophin (*A.C.T.H.*) was administered subcutaneously in the form of a solution containing 5 mg. per ml. of physiological saline. Two highly purified preparations were supplied by the Armour Company, of Chicago: "lot 60–61," which has a biological potency of 100% Armour Standard La-I-A, contains 0.03 unit of oxytocin and 0.06 unit of vasopressin per mg.; "lot 64–A" has a biological potency of 180% of Armour Standard La-I-A and contains 0.03 unit of oxytocin per mg. Both these preparations are contaminated by only negligible amounts of the remaining known pituitary factors.

FIG. 1.—On the left, hind paw of a normal rat; on the right, hind paw of a rat which received three injections of a 1% formaldehyde solution under the palmar aponeurosis at two-day intervals one month before this picture was taken. Note the typical appearance of the chronic "formalin arthritis." The lesion is largely limited to the ankle-joint, which became almost immobilized by the hard cartilage-like indurating granulomatous vegetation. The skin covering this region is very hyperaemic and the joint extremely tender to touch.

Lyophilized anterior pituitary (L.A.P.) was injected subcutaneously in the form of a preparation containing 40 mg. of lyophilized cattle anterior pituitary powder, suspended in a 10% aqueous alcoholic solution.

Cortisone was given subcutaneously as a saline suspension of cortisone acetate microcrystals, each millilitre containing 25 mg. The preparation was that distributed by Merck and Co., Rahway, N.J., in which suspending agents (to keep the microcrystals from settling) and 1.5% benzyl alcohol (as a preservative) are added.

Desoxycortone (D.C.A.) was administered subcutaneously as a microcrystal suspension containing 50 mg. per ml. of corn oil or in the form of pellets weighing 25 mg. each, as furnished by the Schering Corporation, of Bloomfield, N.J.

The techniques used for the production of the alarm reaction are described in the experimental section below.

I. Experiments with Corticoids

Effect of D.C.A. upon the Chronic Stage of "Formalin Arthritis"

In our first experiment we planned to examine the effect of D.C.A. upon the development of the "formalin arthritis." Twelve piebald rats, weighing 110–118 g., were unilaterally nephrectomized and given 1% NaCl instead of tap-water to drink, since previous work has shown that partial nephrectomy and a high sodium intake sensitize to the toxic actions of D.C.A. (Selye, 1946). These rats were then subdivided into two groups of six animals each. Group I acted as untreated controls, group II received 5 mg. of D.C.A. in 0.1 ml. of corn oil subcutaneously twice daily in the form of a microcrystalline suspension. Fourteen days later all animals of both groups were injected with 0.1 ml. of a 4% formaldehyde solution into the right hind paw, as described above. A second similar injection was given into the same paw four days later. Immediately after each injection the initial hyperaemic and oedematous response to the local irritation was approximately the same in both groups. However, a few days after each injection the oedema tended to subside much more in the untreated than in the D.C.A.-injected rats. The experiment was terminated on the 14th day after the first formaldehyde injection, at which time the oedema, induration, and hyperaemia of the paw were significantly more pronounced in the D. C. A. - pretreated than in the control rats (see Fig. 2). It must be emphasized, however, that the high concentration of formaldehyde used in this first experiment caused actual necrosis in the plantar skin, and hence the inflammatory response was quite intense and diffuse (not limited to the ankle region) even in the controls. In spite of this intense local damage, D.C.A. pretreatment aggravated the inflammatory response.

FIG. 2.—Hind paw of a rat pretreated with D.C.A. (left) and a not pretreated rat. Both animals were injected with the same amount of formaldehyde into the joint region, yet the D.C.A.-treated animal developed a much more pronounced inflammatory reaction.

Effect of D.C.A. and Cortisone upon the Subacute and Acute Stage of "Formalin Arthritis"

The second experiment was designed to examine the effect of D.C.A. and cortisone (both in themselves and in combination with each other) on the development of "formalin arthritis." For this purpose we used 40 male piebald rats weighing 120–150 g. All animals were bilaterally adrenalectomized on the first day of the experiment in order to eliminate any complicating endogenous corticoid formation. They were then subdivided into four groups of ten rats each: group I, no hormone treatment; group II, D.C.A.; group III, D.C.A. and cortisone; group IV, cortisone. D.C.A. was administered in the form of two 25-mg. pellets subcutaneously on the day of the

adrenalectomy. Cortisone was given in two 2.5 mg. injections daily subcutaneously. All animals received 1% NaCl as drinking fluid in order to help their survival after adrenalectomy and also because a sodium supplement aggravates D.C.A. intoxication.

An injection of 0.1 ml. of a 1% formaldehyde solution was given in the usual manner into the right hind paw on the second and fourth days after adrenalectomy. On the fifth day the swelling was very mild in the groups receiving cortisone or cortisone and D.C.A., while it was pronounced in the remaining two groups. There was no clear-cut difference between groups I and II (no hormone treatment or D.C.A. alone) nor between those of groups III and IV (cortisone alone or in combination with D.C.A.). At this time another injection of 0.1 ml. of a 2% formaldehyde solution was administered into the left hind paw, with the remarkable result that even three hours after the injection of this rather concentrated solution none of the two cortisone-treated animals (groups III and IV) responded, while the untreated animals, and especially those bearing the D.C.A. pellets, developed a marked hyperaemia and oedema, especially in the ankle region (see Fig. 3).

FIG. 3.—Cortisone-pretreated (left) and D.C.A.-pretreated adrenalectomized rats. Both animals received the same amount of formaldehyde, yet the cortisone-pretreated rat failed to respond, while the animal receiving D.C.A. developed a very pronounced and persistent inflammatory reaction. Adrenalectomized rats of this group receiving both cortisone and D.C.A. also failed to respond, while not pretreated adrenalectomized controls reacted violently, though not quite as much as those receiving D.C.A.

II. Experiments with Hypophyseal Preparations

Effect of A.C.T.H. upon the Acute Stage of "Formalin Arthritis"

Having learned that both in more chronic and in acute experiments cortisone inhibits, while D.C.A. tends to aggravate, "formalin arthritis," it appeared of interest to determine whether A.C.T.H. would act like cortisone, since in so many other respects these two hormones have similar properties. Twelve male Wistar albino rats weighing 120–180 g. were subdivided into two groups of six animals each. Group I received no hormone treatment, while in group II each animal was given 2.5 mg. of A.C.T.H. ("lot 60–61") subcutaneously. Twenty-five minutes later all animals of both groups received 0.1 ml. of a 1% formaldehyde solution into the left hind paw in the usual manner. Again the controls showed an almost immediate hyperaemic and oedematous response at the site of injection, while the A.C.T.H. pretreated animals exhibited only a very slight hyperaemia with almost no oedema. Two hours after the first injection an additional 2 mg. of A.C.T.H. was administered in group II. It was noted that in these animals the local response to the formaldehyde, though detectable, was extremely mild, even several hours after the second A.C.T.H. injection; by this time the paws of the control animals were very hyperaemic and so intensely swollen that the skin covering the plantar surface became shiny from extreme distension (see Fig. 4).

FIG. 4.—A.C.T.H.-treated (left) and not pretreated control. Both animals received the same amount of formaldehyde, yet the A.C.T.H.-treated animal almost completely failed to respond, while the control developed a pronounced oedema of the periarticular tissue and a pronounced hyperaemia of the skin almost immediately after the formaldehyde injection. Unlike the intact control, the A.C.T.H.-pretreated rats of this group gave no particular manifestations of pain when the joint region was touched.

Effect of A.C.T.H. upon the Chronic Stage of "Formalin Arthritis"

Having thus established that the acute local response to formaldehyde is inhibited by an immediately preceding injection of A.C.T.H., we undertook another experiment to examine the influence of prolonged A.C.T.H. treatment upon chronic "formalin-arthritis." Twelve male piebald rats weighing 120–136 g. were subdivided into two groups of six. Group I acted as controls, group II received 5 mg. of A.C.T.H. (lot 64-A) daily subcutaneously, subdivided into five injections of 1 mg. each. After two weeks of this pretreatment the animals of both groups received 0.1 ml. of a 4% formaldehyde solution administered into the right hind paw in the usual manner. With this dosage the immediate oedematous reaction was almost the same in the A.C.T.H.-treated and in the control animals, but in the former the swelling subsided rapidly while in the latter it persisted for several days. Seven and again 12 days later 0.1 ml. of a 1% formaldehyde solution was injected into the same paw in all animals.

After each injection the immediate response was almost as pronounced in the A.C.T.H.-pretreated as in the control animals, but, while in the former only a trace of oedema persisted a few days after each

FIG. 5.—A.C.T.H.-pretreated (left) and not pretreated control. After a few A.C.T.H. injections both these animals were given repeated injections of the same amount of formaldehyde into the paw. The controls developed marked indurative chronic arthritic and periarthritic lesions; the A.C.T.H.-pretreated animals showed only a negligible response.

FIG. 6.—Plantar view of the specimens shown in Fig. 4. Note that although the direct necrosis-producing effect of the formaldehyde injection was the same in both cases, the A.C.T.H.-pretreatment (left) almost completely prevented the proliferative inflammatory response to the local tissue injury which is so evident in the control.

injection and no cumulative effect was detectable, in the latter the inflammation became increasingly more pronounced and gradually proceeded towards induration. By the 25th day after the first A.C.T.H. injection all the control animals had developed a pronounced and proliferative indurating inflammatory lesion, especially in the ankle-joint region, but to some extent also around the metatarsal joints. In several of the A.C.T.H.-treated rats there was also a barely detectable oedema of the paw, but without predilection for the ankle-joint region and without induration. In this series, where the first injection consisted of the concentrated (4%) formaldehyde, definite necrotic changes were obvious in the plantar region of all animals in both groups. This necrosis presumably resulted from the protein-precipitating (fixative) action of the formaldehyde, which of course could not be inhibited by the hormone treatment. It is especially instructive to note that in spite of the creation of an equally severe necrotic focus the inflammatory response to the irritation was so effectively suppressed by the hormone treatment (see Figs. 5 and 6).

Comparative Study of the Effect of L.A.P. and A.C.T.H. upon "Formalin Arthritis"

It will be recalled that in our earlier experiments L.A.P. occasionally produced arthritis even without any local trauma to the joints, while in the above-mentioned groups A.C.T.H. inhibited the development of "formalin-arthritis"; hence we wanted to compare the effect of the two hormone preparations under similar experimental conditions. For this purpose 18 male piebald rats weighing 120–150 g. were subdivided into three groups of six animals each. Group I received no hormone preparation; group II were given 40 mg. of L.A.P. daily, divided into five doses; and group III received 10 mg. of A.C.T.H. (lot 60-61) daily, divided into five doses. On the first, second, and third day of the experiment the rats of all groups were given 0.1 ml. of a 1% formaldehyde solution into the right hind paw in the usual manner. Here again the immediate response to the irritant was only slightly less pronounced in the A.C.T.H.-pretreated than in the other two groups. However, about 24 hours after each injection the oedema had subsided most markedly in the A.C.T.H.-treated animals and remained especially pronounced in those receiving L.A.P. This difference became quite obvious two days after the last formaldehyde injection. Thus A.C.T.H. greatly diminished, while L.A.P. slightly increased, the arthritis-producing effect of formaldehyde.

Our earlier observations had revealed that A.C.T.H. (like cortisone) causes rapid involution of the thymus and other lymphatic organs. This response is also manifest during the alarm reaction produced by any agent capable of causing systemic stress effects (e.g., nervous stimuli, infections, intoxications, exposure to cold), while L.A.P. tends to enlarge the thymus and the lymph nodes (Selye, in the press). It had been observed, furthermore, that during the alarm reaction the phagocytic power of the macrophages is considerably augmented, presumably due to increased A.C.T.H. and gluco-corticoid hormone production (Selye and Timiras, in the press). Since phagocytosis plays an important part in inflammatory reactions we added a few drops of commercial indian ink (Higgins's "American India ink") to the formaldehyde used in this experiment for the production of arthritis. This made it possible simultaneously to follow the process of phagocytosis. Upon necropsy of the rats on the second day after the last formaldehyde injection it became immediately obvious that, on the formalin and indian ink injected side, the popliteal and iliac lymph nodes were most markedly stained in the A.C.T.H. group and least markedly in the L.A.P.-treated animals. The size of these lymph nodes, on the other hand, was smallest in the A.C.T.H.-treated and largest in the L.A.P.-treated rats. Thus, apparently, the removal of the indian-ink particles was accelerated by the A.C.T.H. and inhibited by the L.A.P. preparation, while the morphologic

FIG. 7.—Iliac lymph nodes of rats which were injected with formaldehyde and indian ink into the joint region. On the left, not hormone treated control; in the middle, A.C.T.H.; on the right, L.A.P. pretreated animals. Note the A.C.T.H. increases phagocytosis but diminishes the size of the lymph nodes, while L.A.P. exerts contrary effects.

development of the lymph nodes was promoted by L.A.P. and diminished by A.C.T.H. (see Fig. 7). At the same time we confirmed that A.C.T.H. causes pronounced thymus involution while L.A.P. tends to augment the development of the thymus. This latter finding is all the more remarkable since the adrenal cortical enlargement produced by A.C.T.H. and L.A.P. was almost exactly the same at the dose level employed in this experiment. The adrenals of the untreated controls weighed 21±1 mg., those of the A.C.T.H.-treated rats 30±3 mg., and those of the animals receiving L.A.P., 32±2 mg. This would imply that at the dose level used the corticotrophic effect of the two preparations was quite comparable in degree, as judged by the ability of these preparations to cause adreno-cortical hypertrophy, yet the thymolytic and lympholytic effect was manifest only with pure A.C.T.H. Perhaps some contaminating substances present in the L.A.P. but absent in the A.C.T.H. counteract certain manifestations of the pure corticotrophic hormone.

Effect of the Alarm Reaction Upon the Development of Formaldehyde Arthritis

The last experiment of this series was planned to examine the effect of an alarm reaction (produced by various means) upon the response of the joint tissues to local formaldehyde injection.

Fifty male piebald rats weighing 150–200 g. were subdivided into five groups of ten animals each. Group I served as not pretreated controls. In group II an alarm reaction was produced by forced exercise in a drum cage 12 in. (30 cm.) in diameter and revolving at a speed of 12 revolutions per minute. The animals were forced to run three to four hours at a time, the revolving cage being stopped for a few hours whenever one or two animals of the group were too tired to run. Group III were exposed to a temperature of +1 to +3° C. during 24 hours. In group IV stress was produced by transection of the spinal cord at the level of the seventh cervical vertebra. In group V 0.5 ml. of a 10% formaldehyde solution was injected subcutaneously in the region between the shoulder blades four times during 24 hours. Since fasting increases the ability of various damaging agents to cause an alarm

reaction, all animals of groups II to V inclusive were fasted 24 hours before, as well as during the exposure period. Since all stresses were applied during 24 hours, the total period of fasting was 48 hours. At the end of this time 0.1. ml. of a 2% formaldehyde injection was injected in the usual manner into the right hind paw. Fifteen minutes later pronounced hyperaemia and oedema had developed in the not pretreated control animals of group I while none of the alarmed animals showed more than a trace of hyperaemia or oedema; most of them did not react at all.

It should be specially emphasized that, although some of the alarmed animals were in a very debilitated condition, those which showed no obvious signs of weakness likewise failed to respond to formaldehyde. Hence the failure to react cannot be ascribed merely to a decreased vitality.

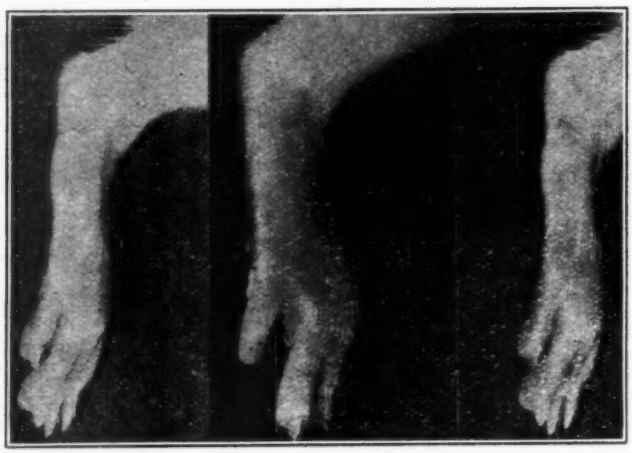

FIG. 8.—On the left, untreated control. Note normal appearance of the hind paw. In the middle, unpretreated control showing pronounced oedema and hyperaemia of the paw after local formaldehyde injection. On the right, paw of an animal in which an alarm reaction was produced by spinal-cord transection. Note almost complete absence of hyperaemia and oedema. The paw is practically indistinguishable from the intact control, although the same amount of formaldehyde was injected into it. A variety of other alarming stimuli (cf. text) exerted the same inhibitory effect.

This view receives further support from our previously mentioned observations on adrenalectomized animals. Many among these were almost moribund at the time of formaldehyde injection and yet responded with pronounced periarticular swelling. We are inclined to assume, therefore, that in this experiment endogenous secretion of A.C.T.H., and consequently of gluco-corticoids, was responsible for the inhibition of the "formalin-arthritis" (see Fig. 8).

Discussion

If we now attempt to evaluate these observations the concept of "non-specific resistance" or "crossed resistance" first comes to mind. We had repeatedly observed that during an alarm reaction, produced by diverse means, both the specific and the non-specific resistance of the organism rise above normal. That is, the exposed individual becomes more resistant not only to the particular damaging agent with which the alarm reaction was elicited but also to entirely unrelated stimuli. Thus an alarm reaction produced by cold, forced muscular exercise, spinal-cord transection, etc., increases resistance against the fatal lung oedema produced by toxic doses of adrenaline, anaphylactic and anaphylactoid reactions, etc. Since such manifestations of crossed resistance were invariably accompanied by histological signs of increased adreno-cortical activity, and since they were never observed in adrenalectomized animals exposed to stress, they had tentatively been ascribed to an increased production of corticoids during the alarm reaction (Selye, 1946; in the press).

We have reported elsewhere upon experiments showing that in the rat anaphylactoid reactions to egg-white can also be effectively inhibited by A.C.T.H. and cortisone (Selye, 1949c).

It is rather probable that in the final analysis the inhibition of "formalin-arthritis" by A.C.T.H., cortisone, and the alarm reaction is due to the effect of cortisone-like gluco-corticoids upon the directly injured tissues. The mechanism of this response is still unknown. It may be related to the anti-hyaluronidase effect of gluco-corticoids (Seifter, Baeder, and Dervinis, in the press), or to their well-known antihistaminic action. It has long been assumed that histamine-like compounds are liberated from tissues at the site of injury, and that these play an important part in inflammation. It is noteworthy, therefore, that the phenomena of "crossed resistance" which can most effectively be compared by the alarm reaction are also markedly inhibited by antihistaminic drugs (e.g., lung oedema, anaphylactic and anaphylactoid reactions). In view of this observation it would be interesting to examine the value of antihistaminics in some of the clinical conditions (e.g., rheumatic fever, rheumatoid arthritis, and lupus erythematosus) which have been effectively combated with cortisone or A.C.T.H.

It is particularly difficult to explain the apparent antagonism between D.C.A. or L.A.P. on the one hand and cortisone or A.C.T.H. on the other. Perhaps D.C.A., being a close chemical relative of cortisone, prevents the latter from reaching its target organs; this might be due to some mechanism of "competition for the substrate," such as has been demonstrated to exist between adrenaline and certain adrenaline derivatives, or vitamins and their corresponding anti-vitamins. However, this possibility is meanwhile purely hypothetical.

It is curious that the impure pituitary preparation L.A.P acts like D.C.A., while purified A.C.T.H. exerts cortisone-like effects. L.A.P. contains A.C.T.H., and under the conditions of our experiments it produced an equally pronounced adrenal cortical enlargement; hence we must consider the possibility that the pituitary contains additional principles which antagonize the A.C.T.H. effect or so modify it that a D.C.A.-like action results. This may be important in the pathogenesis of the "diseases of adaptation." It will be recalled that under certain conditions chronic exposure to stress (e.g., cold, parenteral protein administration) causes nephrosclerosis, myocarditis, hypertension, and arteriosclerotic changes similar to those produced by D.C.A. or L.A.P. (Selye, 1946; in the press).

Finally, it must be kept in mind that the "anti-arthritic effect" of A.C.T.H. and cortisone is by no means specifically directed against the hypothetical pathogen which causes rheumatoid or rheumatic joint lesions. Clinical observations have shown A.C.T.H. to be highly effective also in gouty arthritis (Thorn, Bayles, Massell, Forsham, Hill, Smith, and Warren, 1949), and our observations reveal that even the arthritis caused by formaldehyde—an obviously entirely non-specific inflammatory reaction—is effectively prevented by A.C.T.H. and cortisone. It should be mentioned that upon discontinuation of A.C.T.H. treatment in patients predisposed to gout an attack of arthritis can be elicited (Hellman, 1949; Thorn, *et al.*, 1949). Correspondingly, in many of our experiments (not reported here) we noted that if a "formalin-arthritis" is inhibited by an

alarming stimulus during a period of one to two days it usually flares up in a particularly severe form upon discontinuation of the stress—e.g., cold, muscular exercise. Indeed, sometimes the arthritis developed after a latency period even if the stress was continued. Such observations raise the question whether it will be possible to combat clinical "diseases of adaptation" indefinitely by continued A.C.T.H. or cortisone therapy.

Summary and Conclusions

A technique has been developed which permits the production of an acute arthritis and periarthritis by the local injection of formaldehyde into the vicinity of joints. If large doses of formaldehyde are administered the acute stage is followed by a very prolonged chronic arthritis and periarthritis, characterized by moderate oedema and very pronounced connective-tissue proliferation, with stiffening of the joint and hyperaemia of the surrounding skin. The resulting chronic granuloma is self-maintaining, as it continues to proliferate for weeks after the administration of the local irritant.

This "formalin-arthritis" is slightly aggravated by pretreatment with desoxycortone or crude anterior-pituitary preparations; on the other hand it can be almost completely inhibited by cortisone or A.C.T.H. Thus there seems to exist an antagonistic relationship between D.C.A. or crude anterior-pituitary preparations on the one hand and cortisone or purified A.C.T.H. on the other.

The possible role of such an antagonism is discussed in connexion with the concept of "crossed resistance" and of the "diseases of adaptation."

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TUBERCULOSIS IN EUROPE DURING AND AFTER THE SECOND WORLD WAR

BY

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THE TUBERCULOSIS SERVICES*

Before describing the reorganization of the tuberculosis services in the different European countries it may be helpful to say something of the conditions Unrra found in some of these countries at the end of the war. A preliminary stage of the Unrra programme was to study these conditions at close quarters, assess the damage, and make proposals for a programme of relief and rehabilitation on the basis of this assessment. Travelling throughout the countries as we did, discussing problems with people of all kinds, we were in a position often to get an exceptional overall view of the situation, and were in fact able to report back to the central authorities much that was unknown to them. It is only by remembering what these conditions were that we can appreciate what has been achieved since then.

It is difficult in this country to realize the extent of the disruption and destruction in some of the countries. Of those we saw, none had suffered more than Poland. The occupation had been brutal against a continuous opposition—the avowed German policy had been one of systematic reduction of the Poles to the status of a slave people, and a part of this policy had been the killing of professional and skilled workers. Some six million peop'e of the total population of 33 millions had been killed in concentration camps, at their work, in their homes, or elsewhere. All higher education was stopped. The city of Warsaw was systematically destroyed till less than 10% of buildings were left standing, and other cities were similarly destroyed. The tragic war years were reflected in all we saw: when we went in we found towns that had throughout their area the look of some patches we know around St. Paul's or in the East End. Vast areas of farmland had been laid waste. People were living in cellars, dug-outs, in shells of buildings—one, two, or three families together in a room. Nearly all had lost relations in concentration camps or had spent years in camps themselves; there were half a million orphans; thousands of people were migrating from one area to another; thousands were returning from other countries. In the midst of all this the Polish people were attempting to rebuild—to provide homes, food, and services.

Dr. Gould, who visited Yugoslavia for Unrra, tells a similar story. In his words: "All the factors which tend to increase the incidence and mortality of tuberculosis became particularly acute during the war years. Entire villages had been burned after being plundered of food, clothing, livestock, and valuables. Men and women had been deported as slave labourers. With the combination of enemy action and civil strife the public health service was completely disorganized. Trained tuberculosis doctors and nurses were dispersed and lost."

Dr. McDougall reported from Greece: "In spring, 1945, when Unrra was invited to make a survey of tuberculosis requirements in Greece, after four years of German, Italian, and Bulgarian occupation and a month or more of civil

*The second Milroy Lecture (abridged) delivered at the Royal College of Physicians on February 17. The first lecture appeared last week.

war, it was clear that public health organization was completely out of hand. . . . During the occupation malnutrition had assumed epidemic proportions; anaemia and emaciation were the common lot of the majority of the population." But later he observes that after the war the great problem was not shortage of food but its cost, resulting from the lack of control of prices, black-marketeering, and the sale of imported food supplies by the Government at exorbitant rates.

It is against this background of countries physically and sometimes morally maimed that one must consider the tuberculosis services in the post-war period. The increase in mortality and the high incidence revealed by *x*-ray surveys set the first priority—the finding of hospital beds for the tuberculous sick.

Hospitals and Sanatoria

In Poland during the war all sanatoria had been occupied by the Germans. When they left they took instruments and equipment; buildings were left in a sorry condition. Even before the war there were only 8,300 beds for the tuberculous, representing about one bed per six deaths from tuberculosis. At the end of the war only 800 beds were available; but by May, 1946, there were already some 5,000 beds occupied. Buildings had been restored and supplied with Unrra beds, bedding, and equipment: this represented not only the large contributions by Unrra, but an effective and honest distribution by the Poles themselves, despite the occasional chaos in administration because experienced people were so few. By the end of 1947 there were over 11,500 beds for tuberculosis in sanatoria and hospitals; now they have 17,000—i.e., twice as many as before the war, and for a smaller population.

A major problem was the financing of hospital and sanatorium treatment. Before the war it was paid for by the Social Insurance Organization, the Red Cross, the local authorities, or the individual patient. Those dependent on their local authorities were the least likely to get treatment for an adequate time, if at all. Some of the best sanatoria were owned, directed, and staffed by the Social Insurance Organization. After the war this situation was unchanged, and there was in fact little co-ordination between insurance, private, and public sanatoria. The money provided from public funds was so meagre that, though there were too few beds for the tuberculous, some were empty because there were no funds to pay for patients in them. However, the State contributions to sanatorium treatment have increased considerably each year, and that problem has been resolved. Moreover, since the beginning of this year the split in the services between the Social Insurance Organization and the Ministry of Health no longer exists; the hospitals are now directed by the Ministry of Health, while the Social Insurance Organization has the function of financing the treatment of insured persons.

The conflict between social insurance organizations and the central health services was one we saw reproduced, with much more startling anomalies, in other countries, particularly in Italy. There before the war the National Insurance Organization (I.N.P.S.) had built what were the finest sanatoria in the country. There were few reputable sanatoria belonging to any other organization. Few of the sanatoria were damaged during the war, and in fact in 1945 the situation was very much as before, though some hundreds of beds were still controlled by the military authorities. Insured patients could be admitted to sanatoria of the I.N.P.S. as soon as diagnosed, regardless of their condition, whereas for the very large numbers of non-insured patients (some 60% of the population) there was in many areas little hope of getting hospital treatment at all. Beds in I.N.P.S. sanatoria could be rented by the local authorities, but only when these could pay. In one typical poor district visited no taxes were being paid, and for lack of funds the local authorities with a waiting-list of 240 patients had not been able to send a single patient to hospital for four months, while the Insurance Sanatorium, on the outskirts of the town, had 70 empty beds.

Another outstanding problem in countries where there was a shortage of hospitals was the type of accommodation required for the tuberculous. One striking feature of the sanatoria in Italy apart from their excellent equipment was their size. The Forlanini Institute had 2,000 beds. Another sanatorium, completed in 1939 at Sondalo, in the Italian Alps, was designed to accommodate 3,000 patients. Described as a sanatorium village, it consisted of nine large buildings grouped closely together on the side of a steep mountain. Though the medical treatment in some of the large sanatoria was of a high quality, the dangers inherent in their size were not averted; the lack of a personal element in supervising the welfare of patients was obvious.

In most other countries it has been interesting to observe a definite swing away from the conception of sanatoria as large luxurious establishments up in the mountains. In Holland, where three sanatoria were destroyed in the course of the fighting, it was decided to erect wooden hutment buildings in connexion with existing institutions. It was planned to do this on an extensive scale, and, though the scheme was held up by shortage of material and fittings, several temporary sanatoria were set up, yielding a total of over 1,100 new beds for the tuberculous. In Hungary before the war there were some 6,500 tuberculosis beds; in the spring of 1945 only about 500 beds were available. By 1948 many of the hospitals had been restored, and over 5,000 beds were in use for tuberculous patients. But at least another 8,000 are required, and the present plans are to set up hutment buildings of the Swedish type around existing hospitals, providing treatment, nursing, and food from the central building. Later on the huts not needed might serve for recreation and workshops. In Poland the Swedish Red Cross set up not far from Warsaw a whole children's sanatorium made of excellent hutment wards, with well-equipped and cheerful interiors. In Greece, where there was a dire overall shortage of accommodation, Dr. McDougall elaborated a programme for the supply of prefabricated buildings which would accommodate an additional 5,000 beds and 30 polyclinics; the scheme received enthusiastic support from the Ministry of Health under one Government, but there were many interests involved, and under another Government the scheme was dropped.

In several countries, in addition to erection of these pavilions, other buildings were being taken over, such as country villas, hotels, castles, and spa buildings, and were being converted for use as small tuberculosis hospitals. It is mainly by such means that in Yugoslavia, for instance, the number of tuberculosis beds has been increased from the pre-war figure of 3,250 to 10,300 in 1949. Some countries have decided that 5–10% of the beds in general hospitals in the towns must be assigned, at least provisionally, to the care of tuberculous patients; given adequate precautions against contagion, this is a measure which might well be given serious consideration in our own country (Boland, 1948).

Related to standards in England, the level of hospital care in some of these countries, and particularly in some areas, was low. Special post-war conditions aggravated the situation. It was not rare to find hospitals where

patients had to bring their own linen if they were to have any, and no drugs were provided; frantic relatives would spend much time trying to buy such drugs as calcium gluconate on the black market, to say nothing of penicillin and, later, streptomycin. To speak of these conditions is not to imply that our own services are faultless. Though the general standard of institutional care for the tuberculous here is high, even we are not without so-called sanatoria which have no diagnostic equipment, no facilities for active treatment, and no staff qualified to apply it if they had it, and whose patients are sent many miles away on the rare occasions when an *x*-ray film is thought necessary.

With the realization of the problems there was a growing feeling in several countries that the available beds were not being properly utilized, and a part of the plans for the future was to have centres to which patients would be admitted for primary observation and decision regarding the hospital to which they should go. Even more was it being realized that most of the local authorities who before the war had complete responsibility for providing tuberculosis services were far too small to perform such a function. We have seen this in England, and the regionalization of the hospital services is the natural outcome. This is happening in many countries. In Italy the provinces have been grouped into larger regions. In Czechoslovakia and Yugoslavia, too, there has been a regrouping in large regions to ensure a more equitable distribution of beds. In France also, where new legislation has brought radical changes in the tuberculosis services, these are now established on a regional basis, each region including several *départements*. The aim, as in England, is that each region shall provide a complete hospital service. The new Act stipulates that the hospital in the principal town of each *département* shall include a tuberculosis centre, with beds; where the town has a medical school the hospital unit becomes the regional tuberculosis centre.

The assumption by the State of much greater financial responsibility in provision of treatment for the tuberculous is an outstanding feature in the post-war services. The wartime increase in tuberculosis, in the absence of undue increase in other diseases except venereal disease, gave rise to the conception of this public health problem as a national emergency. The financing of sanatoria received radical reform. Before the war one of the causes of delay in sanatorium admission in France was the multiplicity of organizations, which made quite involved the problem of finding out before a patient went into sanatorium who would pay for him. Now if a bed is available the patient is admitted immediately; the payment of sanatorium expenses is incumbent on the *département* where the patient lives, unless eventually defrayed by a public or private body. All tuberculosis institutions qualify for a State subsidy, amounting to as much as 75% for building and equipment expenses. In many other European countries, including our own, the cost of institutional treatment is now entirely borne by the State.

Similarly, financial assistance to the tuberculous and their families, as a national scheme, was introduced in England in the middle of the war. As a basic principle it was recognized that the tuberculous patient must be relieved of economic anxiety, so that he might accept treatment for as long as is necessary, and so that his family might be protected. The measures introduced brought partial alleviation; but the scales were at a minimum subsistence level, and only certain patients qualified. Now since July 5, 1948, financial aid to tuberculous patients is covered by the National Assistance Board. In France since the liberation there has been increasingly generous social legislation, and part of it is directed to the new tuberculosis service. Previously patients received social insurance benefits for six months only. The new legislation grants the benefits of "prolonged illness" to insured tuberculous patients and to members of their families should they become tuberculous; during three years the patient gets all treatment expenses and half his salary. In Poland, Bulgaria, and Czechoslovakia similar new schemes of financial aid to the tuberculous have been introduced.

One concept, that of the so-called preventorium, which is practically unknown here, is prevalent in many European countries; the preventoria constitute sometimes more than 25% of the institutional tuberculosis accommodation. To these places are sent small children from tuberculous families, particularly when there is at home an infective patient who cannot or will not go to a sanatorium; for one or more years the children are kept away from the source of contagion, and then return at the end of their stay in the preventorium. Some were well organized; others we saw were barracks with children looking less healthy than those seen on the city streets. The problem is a thorny one. Certainly accommodation should be available for isolating children from households with an infective patient who cannot go away. However, one would like to be certain that every effort has been made to remove the infective case, since the preventorium is a second-best solution, returning the child to the infective household sooner or later, and leaving exposed the even more susceptible adolescents.

Dispensaries

The dispensary service is the basic diagnostic unit in European countries as it is here. But whereas here dispensaries have functioned for many years under the local authority, there they were directed before the war by a number of different organizations. In France, for instance, the 920 dispensaries had been created in the past 20 years mostly by local initiative, many by private organizations and Red Cross committees; there was no connexion with official centres; there was overlap in some areas, no service in others; financial arrangements and follow-up were extremely involved. The 1945 legislation makes the organization similar to what we have here; in each *département* now a list of dispensaries has been drawn up, and to each is ascribed a definite sector so that the districts concerned cover the whole *département*. A tuberculosis specialist is appointed to supervise all tuberculosis work in the *département*, and with him a specialized social worker. Each region has now a tuberculosis consultant with high qualifications. Another new feature is that many sanatorium medical officers attend at local dispensaries.

In Greece, too, the multiplicity of voluntary organizations was responsible for many gaps in the service. In whole large areas such as Epirus, with a population of over 300,000, there was not a single dispensary or institution for the diagnosis or treatment of tuberculosis. In Poland there was a basic organization, centred on the regions with their populations of about 1½ millions each, and numerous dispensaries in the districts, to a total of over 500 before the war. But here again, in the cities at least, there was a division between the local authority dispensaries and those belonging to the Social Insurance Organization, with little co-ordination between the two. The recent transfer of responsibility to the Ministry of Health is resolving a part of the problem, but the development of dispensary services is proceeding relatively slowly. The quality of the work in the hundreds of small country dispensaries varies

greatly; most of them are staffed by local practitioners who give one or two sessions a week and have no particular experience of tuberculosis. In Yugoslavia before the war there were some 50 dispensaries only, most of them poorly equipped; now there are 136, each of them with an *x*-ray unit and staffed by doctors who, while they have many other duties, have had at least three months of special training in tuberculosis work.

In Sweden the dispensaries were previously organized and financed by the National League Against Tuberculosis; now the expenses are chiefly defrayed by the State. In Belgium some dispensaries belong to the Œuvre Nationale Belge, some to other organizations; the Ministry of Health now covers 80% of dispensary expenses, compared with 50% pre-war. Denmark has a highly co-ordinated service with 85 dispensaries, of which 81 belong to the State. Every county, with about 150,000 population, has its own independent service, with tuberculosis hospital and dispensary working closely together; the specialist in charge of the hospital also serves the dispensaries in the neighbourhood. Great importance is attached to bacteriological examination, and in fact it is highly centralized, all cultures being done at the State Serum Institution in Copenhagen.

Staff

To the many problems of the tuberculosis services is added that of a lack of qualified personnel. Italy is the only country in which it is claimed that there is an excessive number of doctors, though even there adequate medical services are not readily available to large sections of the population. On the other hand, in Poland, where already before the war there were only 13,000 doctors for a population of 32 millions, the problem has become acute. In 1945 there were under 7,000, and in January this year 8,400—for a population of 24 millions. Moreover, they are concentrated in the towns, and there are rural areas with only one doctor serving 10,000 to 15,000 people. University medical courses were stopped throughout the war, and so, although the medical schools are now more than full and there are two new schools, there is little hope of the need being met before 1954 or 1955. There is a particular dearth of doctors with tuberculosis experience. Two-month postgraduate courses in tuberculosis are being held in all medical schools, but it is not easy to get doctors to attend these, as all are so busy. In Yugoslavia, also, the lack of doctors was a main obstacle to the programme; in 1945 there were only 25 tuberculosis specialists left of a pre-war total of 77. There, too, intensive three-month courses are being held for general practitioners, and three-year courses for the training of specialists. In France under the recent laws there is now provision for selection, by competitive examination, of physicians joining the dispensary service. Many more than before the war are engaged full-time. Physicians appointed to sanatorium posts are also now required to hold certain higher professional qualifications.

A nursing shortage is obvious in many countries, but nowhere has it had so severe an impact on the services as in this country. In Mediterranean countries nursing as we understand it does not exist in many places, and the work is done by nursing aids with little training In many other countries there is a severe dearth of trained nurses, which was obvious before the war and has been made worse by the loss of so many during the occupation. Though many new training schools are being set up, the needs will not be met for many a year. However, it has been instructive to see how in some countries good nursing care is given in certain hospitals with a very small number of trained nurses and a sufficiently large number of domestic aids to carry out all duties except those requiring nursing skill. In our own country the number of nurses available would not rank elsewhere as a shortage, but thousands of beds are empty for "lack of staff," and the common waiting period for admission to sanatorium is six to nine months. This problem is so grave as to constitute by far the greatest obstacle to progress in our tuberculosis services to-day. In the present acute situation, at least a partial solution might be found in a revision of traditional ideas concerning division of labour between nursing and domestic staff (the revision could include a "job-analysis" on tuberculosis wards), followed by an imaginative effort to secure staff for hospital duties which do not require skilled training in nursing.

Rehabilitation

Rehabilitation services in Europe are for the most part rudimentary or non-existent. Countries are taking a great interest in rehabilitation projects, but economic circumstances are such that these schemes must take second place One scheme is particularly worthy of mention, and deserves to be reproduced here—that of the tuberculosis service for students in France. It is a complete diagnostic, treatment, and rehabilitation service. The focus of the service is the Sanatorium des Etudiants in the French Alps above Grenoble. University students, young graduates, and doctors are accepted as patients; many of them have been diagnosed on routine examination at university. The State pays part or the whole of the cost of treatment, according to the patient's ability to pay. A basic aim is to maintain morale and so hasten recovery. The sanatorium employs a director of studies, who takes details of the level of studies of each patient who arrives, and together with the medical adviser decides how much and what type of work the student can do each day. According to the stage of illness, a student may be encouraged to do individual reading in bed, or take part in study circles, or attend lectures given in the sanatorium by visiting professors, or finally attend lectures on one to three days a week at the University of Grenoble. Lectures are relayed to the bedside for those who cannot get up. Each patient, in fact, gets individual attention as a student who happens to be ill; that is the constant approach. There is none of the mental paralysis one finds often elsewhere: the social and intellectual life of the sanatorium is remarkably lively—there are concerts, plays, and discussion circles, and the students even produce four times a year a good literary journal called *Existences*. The sanatorium is now only one of several institutions: one in Paris takes in students waiting for a bed, and other post-treatment hostels in Grenoble and Paris serve the needs of students between their leaving the sanatorium and their full recovery. In Paris there is in addition a "medico-social" restaurant, where special meals are served for students who have a medical recommendation from the dispensary set up by a Relief Committee. Belgium, Switzerland, Holland, and Poland also each have a special sanatorium for university students.

Routine Examinations

In several countries schemes for regular medical examination of university students have been introduced or extended since the end of the war, and we are falling far behind in this respect. In France yearly medical examinations of university students was introduced by a decree in April, 1946. *X*-ray examination has also been made compulsory for all teaching staffs—a measure entirely justified by the reports of minor tuberculosis epidemics discovered in school classes.

The examination of students is only a part of the work aiming at early diagnosis by routine examination which has been considerably extended since the advent of mass miniature radiography. This method has proved its value in the detection of undiagnosed lesions in large population groups, and there is no doubt now that it has an important place in tuberculosis eradication. Reports from services where annual examinations have been made have shown a falling incidence at successive annual re-examinations of a community, the fall being almost certainly due to the discovery of the early lesion with good prognosis, and the reduction of the infector pool. In England it has been developed as a national scheme, operated by as yet a limited number of local authorities; teams are trained centrally, and the technical level of work is relatively high. On the Continent it has been taken up by different organizations, and on an extensive scale in all countries I think except France; in fact, it has been adopted with almost embarrassing enthusiasm as in the first line of tuberculosis control. In countries which still have a very high prevalence of tuberculosis, and whose material resources are limited, mass radiography can for the time have only a small part in tuberculosis control; its role there can be to make spot surveys and so determine which population groups require prior attention in the tuberculosis programme. There is a danger at the moment in some countries that its excessive use in areas without adequate services may mean that other more fundamental work in tuberculosis control is being neglected.

B.C.G.

Another method of control that has been used widely since the end of the war is that of immunization against tuberculosis by B.C.G. vaccine. It was already being extensively used in Scandinavian countries. At the end of the war teams of the Danish Red Cross undertook B.C.G. vaccination in Poland, Hungary, and Germany. In 1947 it was decided by the newly formed Unicef (United Nations International Children's Emergency Fund) that, in addition to programmes of feeding and re-establishment of children's institutions and services, Unicef should continue and extend to several other countries the work started by the Danish Red Cross. This scheme is now in operation. Unicef furnishes supplies and equipment: Scandinavian teams do the initial field work; the Ministry of Health in each country furnishes local teams which will eventually take over the work; the World Health Organization assists with its advisory staff and will carry out a statistical analysis of the results. Finland, Poland, Czechoslovakia, Yugoslavia, Hungary, and Greece are taking part. By June 1, 1949, about six million tuberculin-negative children had been vaccinated. B.C.G. vaccination is being adopted with enthusiasm in these countries. One must hope that the development of basic measures of tuberculosis control will not be thereby neglected, for, even if the vaccine is as effective as its most ardent supporters claim, the basic tuberculosis services will still be required for many years to come.

International Services

The services described above have been those concerned specifically with tuberculosis. No doubt the measures taken to re-establish or improve the services are contributing to the post-war decline in tuberculosis mortality. But much of the decline, which in some countries started before the end of the war, and in nearly all countries has occurred since the war, may be attributed to the national and international services designed on a generous scale to protect the health of the peoples. In this respect it can be said that the work of Unrra in relief and rehabilitation and in the restoration of normal living was an important contribution to reduction of the tuberculosis rate.

Looking back on the work of Unrra in that post-war period, there is no doubt that it was a major achievement in international work. With all its faults, the organization carried out the task given to it by the United Nations—the task of relieving the most distressed areas in the war-ravaged countries, and of providing supplies to assist those countries to return to at least their pre-war standard of living. Because of it the dangers of famine and epidemics in the chaotic post-war period were averted, and with them the danger of another grave increase of tuberculosis.

Unrra, having provided immediate relief and the material for future reconstruction, was followed by other organizations operating under the United Nations; one of these is the World Health Organization. Established officially in 1948, WHO confirmed the decision of the Interim Committee, which had preceded it, regarding the priorities to be given to different diseases in the work of the organization. It was agreed without question that malaria, tuberculosis, and venereal diseases were the three main scourges demanding prior and special attention. An Expert Commitee on Tuberculosis was formed, and held its first meeting in July, 1947. Among its recommendations to WHO were the following:

1. That travelling fellowships be awarded to countries most in need.

2. That the Tuberculosis Section prepare from time to time material on recent developments of special importance for the use of physicians in different countries who may request such information. Dr. McDougall, who heads the section, reports that there has been a great demand for data on tuberculosis mortality and morbidity rates, mass radiography, and B.C.G. (Many of the rates given in this paper are taken from the WHO *Epidemiological and Vital Statistics Reports* (1948).)

3. That demonstration teams shall be available, at the request of governments, for countries where new tuberculosis schemes are about to be introduced. In this connexion work has been done in China, Greece, Poland, and India.

4. That WHO should develop and recommend uniform procedures on such matters as the classification of tuberculosis, *x*-ray interpretation and mass radiography, bacteriological diagnosis, and evaluation of new chemotherapeutic agents such as streptomycin.

It is fully acknowledged by those working for WHO in this field that they have a relatively limited part to play in the overall campaign for reduction of tuberculosis prevalence; in their words: "Without progressive improvements in the purely public health field, and above all in the economic status of countries, the best efforts of tuberculosis workers can be of only limited significance" (McDougall, 1948).

Conclusion

Sir Wilson Jameson, in his Harveian Oration to this College in 1942, traced the phases of advance in social medicine, and showed how many of them resulted from the medical necessities of war. Similar great advances were already being made then, but he forecast also a different attitude from that following the first world war, in that there was even then in 1942 "everywhere a conviction that great changes lie ahead of us and a desire so to plan the measures designed to meet the national emergency that some permanent good may be derived from them when the world is once again at peace."

It is true that out of this last war, with all its catastrophes and refined barbarities, people have emerged with a deepened sense of national and international responsibilities: of national responsibilities because we learned in

time of stress to co-ordinate action in defence of the community, and methods dependent on bounty and charity have been replaced in many countries by the conception of the community's duty to protect itself as a whole and each individual who may suffer misfortune. Hence the general measures we have seen of co-ordination of the tuberculosis services, their financing by the State, free treatment, and financial allowances to the sick and their families. The war awakened also a sense of international duty. It had brought together peoples who had lived in ignorance of each other, and, having assumed duties towards them in wartime, the projection into peacetime was natural, so that well before the war ended there were being laid the plans of international relief and co-operation which finally materialized in Unrra and then in the World Health Organization.

The wartime rise and the post-war fall in tuberculosis provide evidence that constitutes an indictment of existing social services when one relates them to what they should be. That tuberculosis is related to social conditions was already known, but the wartime evidence showing precise points of rise and fall is outstanding. With such evidence as this, and with the knowledge of rates obtained in countries such as Denmark, no country with a tuberculosis rate anywhere above the lowest rate yet recorded can afford not to make a continuous attack upon the disease and upon the conditions that favour its development. It has been said that "public health is purchasable, and that within natural limitations any community can determine its own death rate" (Biggs, 1911). Certainly of tuberculosis it is true. The more sore the economic plight of a country, the less it can afford to tolerate a preventable disease which affects the most active members of the community, and it is particularly in such countries that the tuberculosis programme should have a high budget priority.

We have the good fortune to be living through an age of extraordinary achievement. In the 80 years since the discovery of the bacterial sources of disease the advancement of knowledge in medicine alone has raced far ahead of our application of it to human welfare. Wars have arrested and then spurred on our progress. The means for attack on tuberculosis can be clearly seen; if the necessary measures are taken, and given a long enough respite from mutual massacre, there is no reason why this disease which has plagued the continent of Europe for many hundreds of years should not be almost eradicated before this century is out.

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VARIATIONS IN BACTERIOLOGY OF THROAT AND RECTUM OF INFANTS IN TWO MATERNITY UNITS

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This investigation was prompted by the suggestion that gastro-enteritis in infants might be due to bacteria usually regarded as normal inhabitants of the throat or intestine (Cruickshank, 1946). Particular strains or types of these organisms might be concerned; for instance, a serological type of coliform bacillus such as has been isolated from infants with diarrhoea (Bray, 1945; Giles and Sangster, 1948), and strains of *Streptococcus faecalis* which are active producers of tyrosine decarboxylase (Gale, 1944). It was also suggested (G. S Wilson, 1947; personal communication) that *Staphylococcus pyogenes* might be the cause of some outbreaks of neonatal diarrhoea. The laboratory studies necessary to establish the serological type of coliform bacilli, the tyrosine decarboxylase activity of streptococci, and the phage type of staphylococci require considerable time and experience. In field investigations of an outbreak of neonatal diarrhoea it would be helpful if simple bacteriological methods could be used to give a rapid indication that coliform bacilli, faecal streptococci, or aureus staphylococci were present in cases with greater frequency than in healthy infants. Some observations suggested that this might be the case.

It had been noted in some outbreaks that coliform bacilli were often isolated from throat swabs (J. Taylor, 1947; personal communication) and in others that streptococci

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were present in greater abundance than usual in films and cultures of faeces (E. F. Gale, 1947; personal communication). Numerous surveys of the incidence of *Staph. pyogenes* in older age groups have revealed differences which suggest that it might be useful as a base-line for the study of epidemics of neonatal diarrhoea and vomiting to determine the incidence of the organism in newborn infants. In this investigation, therefore, simple bacteriological methods were used for routine examinations of throat and rectal swabs from infants. A general survey of the organisms in cultures was made and three points were particularly studied: (1) the frequency with which coliform bacilli were isolated from throat swabs; (2) the frequency with which colonies of *Str. faecalis* outnumbered those of coliform bacilli in cultures of rectal swabs; and (3) the frequency with which *Staph. pyogenes* (aureus) was isolated from throat and rectal swabs.

Technique

Infants in two maternity units were studied. Details about the two units, A and B, are given by Dr. Janet Roscoe at p. 1144 of this issue in a report on the incidence of infections in them. Apart from one outbreak of mild staphylococcal infections of eyes or skin there were only sporadic infections in the infants and no severe diarrhoea or vomiting. At Unit B weekly swabbings of all infants were examined from April to July, 1947, and from October, 1947, to April, 1948. At Unit A all infants in one of the four wards were swabbed each week from May to July, 1947, and from November, 1947, to April, 1948.

All swabs were taken by Dr. Roscoe, with care to swab the posterior pharyngeal wall and to avoid contamination of the rectal swab by the circumanal skin. The swabs were plated within a few hours of the time they were taken. Throat swabs were plated on horse-blood-agar plates which were incubated aerobically overnight and examined for aureus staphylococci, coliform bacilli, and other organisms. Rectal swabs were plated on horse-blood-agar plates which were incubated anaerobically for 18 hours in the first three months of the investigation and from November onwards for 42 hours before examination. The growth of coliform bacilli and streptococci was recorded as +, ++, or +++, and the presence of other organisms was noted. When the estimate of streptococcal colonies was higher than that of colonies of coliform bacilli, streptococci were said to be present in excess. Rectal swabs were also plated on 7.5% salt-agar plates which were incubated aerobically overnight before examination for aureus staphylococci. Films from rectal swabs were stained by Gram's method and examined for lactobacilli, Gram-negative bacilli, and Gram-positive cocci.

From time to time the following tests were done: coagulase tests on aureus staphylococci; V.-P., M.R., citrate, indole, and 44° MacConkey reactions on coliform bacilli; grouping of streptococci. Some streptococci isolated at the end of the investigation were tested for tyrosine decarboxylase activity.

Results

From throat swabs albus staphylococci and viridans streptococci were almost always isolated; pneumococci were occasionally found, as were haemolytic streptococci. None of the latter reacted with Group A, C, or G sera; one strain tested with Group D serum was found to belong to that group. The frequency of isolation of aureus staphylococci and coliform bacilli will be described later. All strains of aureus staphylococci tested were coagulase-positive. The majority of coliform bacilli tested were found to be faecal *Bact. coli*, a few were *Bact. aerogenes* or irregulars.

From most rectal swabs blood plates showed colonies of coliform bacilli and streptococci. The streptococcal colonies were readily recognizable as low convex bluish colonies about 2 mm. in diameter, usually with greening under them, sometimes with no change in the blood and occasionally with β-haemolysis. Tests of colonies with the different types of haemolysis showed that they were Group D. At the end of the investigation 18 colonies of Group D streptococci isolated from rectal swabs were tested for tyrosine decarboxylase activity. One was inactive. The other 17 were active producers of the enzyme; 10 of them were picked from cultures of two infants (five each), three from a third infant, and four from four other infants. A few colonies of clostridia were occasionally seen on the blood plates. Proteus was very rarely present. Lactobacilli were isolated, but irregularities in the frequency of their appearance and in the number of colonies relative to other organisms were such that analysis of the results was not made.

On MacConkey plates non-lactose-fermenting colonies of coliform bacilli were uncommon and the organisms in such colonies were not salmonellae or shigellae. Colonies of coliforms and cocci appeared in the same relative numbers on MacConkey plates as on blood plates of the same specimen, but colonies of streptococci could not be distinguished from those of other cocci.

Films of faeces stained by Gram's method usually showed large numbers of Gram-positive rods resembling Cruickshank's (1925) drawings of lactobacilli. Coliform bacilli were less frequently seen, and Gram-positive cocci, usually in pairs, still less frequently. Gram-positive rods resembling bacilli or clostridia were occasionally seen.

Differences between Cultures from Infants of Different Ages

In cultures from infants during the first 24 hours of life growth was scanty or absent, and the percentage of swabs from which the organisms listed in Table I were isolated

TABLE I.—*Percentage of Positive Cultures from Infants on Each of the First Five Days of Life*

	Age of Infant in Days				
	0	1	2	3	4
Throat swab:					
Aureus staphylococci ..	19	13	17	25	27
Coliform bacilli	0	9	14	17	17
Rectal swab:					
Coliform bacilli	22	60	74	86	75
Streptococci	26	76	69	92	85
Excess streptococci	15	56	31	36	36
Aureus staphylococci ..	8	17	15	18	26
No. examined ..	27	24	42	36	41

was with one exception lower than on subsequent days. The exception was that aureus staphylococci were found in the throat almost as often on the first day of life as on later days. The results from infants aged 1, 2, 3, or 4 days showed an increase in the percentages of positive results during the first three days, and figures for the 4-day-old infants were approximately equal to those for 3-day-old infants. Subsequent comparisons were therefore made on results of swabs from infants aged 3 or more days.

The stained films of faeces showed that lactobacilli were present in an increasing percentage of infants on each of the first five days of life, the percentage positive on each day being 4, 14, 49, 60, and 82.

Differences between Cultures from Infants in Unit A and Unit B

Cultures were made from 187 infants aged 3 or more days in Unit A and from 198 infants aged 3 or more days in Unit B. The last column of Table II gives the percentages of these cultures from which certain bacteria were isolated, and the other columns give the percentages for successive time periods during the investigation. These periods were the result of grouping successive weekly swabbings so as to give, when possible, about 20 or 30 results in each period.

TABLE II.—*Percentage of Positive Cultures from Infants Aged 3 or More Days*

	Period										
	1 April-May	2 May-June	3 June-July	4 October	5 November	6 December	7 January	8 February	9 March	10 April	Total
Unit A											
Throat swabs:											
Aureus staphylococci		27			19		6	30	40	23	24
Coliform bacilli ..		10			9		10	0	4	8	8
Rectal swabs:											
Coliform bacilli ..		95			82		84	85	68	75	82
Streptococci ..		100			85		74	95	92	69	86
Excess streptococci		27			47		36	45	40	36	38
Aureus staphylococci		43			3		21	30	36	13	23
No. examined ..		40			32		31	20	25	39	187
Unit B											
Throat swabs:											
Aureus staphylococci	55	76	54	18	39	29	53		19		42
Coliform bacilli ..	22	12	54	41	35	25	47		33		33
Rectal swabs:											
Coliform bacilli ..	98	94	96	95	86	93	95		96		95
Streptococci ..	75	94	100	86	77	72	84		89		84
Excess streptococci	3	6	8	5	22	25	31		33		16
Aureus staphylococci	55	59	38	50	33	32	32		26		35
No. examined ..	36	17	26	22	23	28	19		27		198

All these infants received fluids or complementary feeds during the first few days of life.
Mild staphylococcal infections occurred in infants at Unit A in mid-May, July, and late February and March, and in Unit B in mid-May and January.
The following differences between the percentages of totals were statistically significant:
Throat swabs: aureus staphylococci D/SE = 3·8; coliform bacilli D/SE = 6·4.
Rectal swabs: coliform bacilli D/SE = 4·1; excess streptococci D/SE = 5·0; aureus staphylococci D/SE = 2·6.

Aureus staphylococci were less often cultured from both throat and rectal swabs taken in Unit A than from those taken in Unit B. The figures for successive time periods showed that in both units these organisms were more often isolated at times when mild staphylococcal infections were occurring in the infants. Not enough data were available to show whether an increased prevalence of the organism preceded the appearance of infections as suggested by Allison and Hobbs (1947) or occurred rapidly at the time when the first case was noted. The differences in the frequency with which aureus staphylococci were isolated in the two units can be attributed to a greater exposure of infants in Unit B. All infants in Unit B were in the same nursery as the infected infants, whereas in Unit A swabs were taken from infants in four nurseries and some infants were in nurseries where there were few or no cases. Infants in Unit B were often kept in the unit longer than those in Unit A. The environmental conditions in Unit B (see Roscoe, p. 1144 of this issue) were more likely than those in Unit A to allow the spread of organisms from infant to infant.

Coliform bacilli were less often found in the throat and rectal swabs from Unit A than in those from Unit B. The percentage of cultures of rectal swabs yielding streptococci was similar in the two units. The cultures of rectal swabs in which streptococcal colonies were in excess of those of coliform bacilli formed a greater percentage of all cultures in Unit A than in Unit B. The percentage of cultures with excess streptococci increased in both units in November, when the time of incubation of the cultures was increased from 18 to 42 hours. The difference between the units was maintained throughout the investigation, though it was less in the later periods. The plates on which streptococci were present showed an excess of the organism more often in Unit A than in Unit B (Table III).

TABLE III.—*Percentage of Cultures of Rectal Swabs with Streptococci in which Streptococcal Colonies Outnumbered Colonies of Coliform Bacilli*

	Period										
	1 April-May	2 May-June	3 June-July	4 October	5 November	6 December	7 January	8 February	9 March	10 April	Total
Unit A		27			55		48	47	43	52	44
Unit B	4	6	8	5	29	35	37		37		19

In films of faeces, lactobacilli were found in 93% of 187 examined from Unit A and in 71% of 198 examined from Unit B. Differences noted between the units were that in Unit B there was (1) a higher percentage of cultures yielding coliform bacilli, (2) a lower percentage of cultures with excess streptococci, and (3) a lower percentage of films showing lactobacilli. The explanation which suggested itself was that these differences were due to the fact that a greater proportion of infants in Unit B than in Unit A were receiving complementary feeds or were artificially fed at the time of examination. Below is presented an analysis of data which were available on the effect of different feeding regimes on the bacterial flora.

Differences between Cultures from Infants on Different Feeding Regimes

Cultures were examined without knowledge of the feed given to the infant. With the help of Dr. Roscoe's data the bacteriological results were analysed to show results for infants on different feeding regimes.

In Unit B among 33 infants who were artificially fed the percentage of cultures of throat swabs yielding coliform bacilli was 60, as compared with 36% in 66 infants receiving complementary feeds and 29% in 42 infants who were breast-fed at the time of examination but had received fluids during the first few days of life.

A regime of breast-feeding with no additional fluid or food was introduced in two wards of Unit A in January. This made it possible to compare the bacteriology of the throat and rectum of completely breast-fed infants with that of three groups of infants. The first group had received complementary feeds during the first few days of life but were breast-fed when specimens were taken; the second group were receiving both breast and complementary feeds; and the third group were artificially fed at the time of examination.

The results (Table IV) varied in a similar way to those already mentioned. Coliform bacilli were not found in the throats of 65 breast-fed infants; they were present in two of 28 infants who had received complementary feeds but were breast-fed when examined, in four of 28 infants who were receiving both breast and complement, and in

TABLE IV.—*Percentage of Positive Results in Infants in Unit A Aged 3 or More Days on Different Feeding Regimes*

	Feeding of Infant			
	Breast Only	Breast After Complement	Breast and Complement	Artificial
Throat swabs:				
Aureus staphylococci ..	23	29	18	21
Coliform bacilli ..	0	7	14	17
Rectal swabs:				
Coliform bacilli ..	62	76	86	100
Streptococci	86	71	82	92
Streptococci in excess ..	41	35	21	19
Aureus staphylococci ..	12	14	21	12
No. examined ..	65	28	28	24

four of 24 infants who were artificially fed. Only one of the 10 infants whose throat swabs yielded coliform bacilli had vomited, and that one on a single day only. Three of the other nine had oral thrush. The remaining six were apparently perfectly healthy infants. In cultures of rectal swabs coliform bacilli were isolated less often from infants who received breast milk only and with increasing frequency in the other three groups : (1) those solely breast-fed but having received complement, (2) those receiving breast and complement, and (3) those artificially fed. Streptococci were found in approximately the same percentage of cultures from all four groups, but their colonies were in excess of the colonies of coliform bacilli in a higher proportion of cultures from infants who were receiving breast milk only at the time of examination than in cultures from infants receiving artificial feeds solely or as complement.

The absence of coliform bacilli in the cultures of throat swabs from 65 infants who were entirely breast-fed and the isolation of coliform bacilli from the throats of a number of infants who had received or were receiving complementary feeds (Table IV) suggested that these bacilli had been introduced with the feeds. In accord with this suggestion were the higher percentages of isolations of coliform bacilli from rectal swabs of artificially fed infants (Table IV) and the more frequent detection of Gram-negative bacilli in stained films of swabs from the same group of infants (Table V). Tests were made on several

TABLE V.—*Percentages of Films from Rectal Swabs showing Different Numbers of Organisms*

Organism	Growth	Feeding of Infant			
		Breast Only	Breast After Complement	Breast and Complement	Artificial
Lactobacilli ..	+	19	10	20	27
	++	17	24	40	33
	+++	54	59	35	17
	Total	90	93	95	77
Gram-negative bacilli	+	15	17	25	43
	++	0	3	5	14
	+++	0	0	0	10
	Total	15	20	30	67
Gram-positive cocci	+	17	3	25	50
	++	2	0	10	14
	+++	0	0	0	3
	Total	19	3	35	67
No. examined		59	30	30	30

samples of the ingredients of the complementary feeds and of feeds prepared in the ward, but coliform bacilli were not isolated. This did not, however, rule out the possibility that bacilli were introduced with some feeds. It is probable also that there were alterations in the intestinal environment of the artificially fed infants which favoured the growth of coliform bacilli. The coliform bacilli isolated from the throat may have been merely transients there, deposited from feeds or by regurgitation.

The Gram-stained films from rectal swabs provided further evidence (Table V) of differences in the intestinal flora of infants receiving different feeds. Lactobacilli were less often seen, and far less often seen in large numbers, in the films from artificially fed infants than in films from infants receiving breast milk only at the time of testing. The converse was found for Gram-negative bacilli and Gram-positive cocci.

Discussion

The simple cultural methods which we used showed the following maximum percentages of isolations from infants aged 3 or more days : (1) 54% for coliform bacilli from the throat in Unit B and 10% in Unit A ; (2) 47% for excess streptococci from rectal swabs ; (3) 40% for aureus staphylococci from the throat and 50% from rectal swabs at times when no staphylococcal infections were occurring in infants. Films of faeces showed lactobacilli in large numbers in 60%, Gram-negative bacilli in 20%, and Gram-positive cocci in 15%. Figures of this order suggest that the methods might indicate the more frequent presence of large numbers of these organisms in infants with diarrhoea as compared with controls. Analysis of our results shows that in making these comparisons attention must be paid to the age of the infants and to the method of feeding, since these factors affect the results.

The methods used in this study might therefore, if applied to field investigations of epidemics, give a rapid indication of an abnormality in the bacterial flora of the cases. This would aid in deciding on the lines of search for the sources of an infection and its mode of spread. Subsequent typing of strains would be essential in order to establish the identity or difference of strains isolated from patients and other sources. The simple cultural methods which were used may be successful when applied to cases in which the infecting organism is likely to be present in large numbers. In the search for carriers and in the bacteriological diagnosis of some cases selective media may be necessary. For example, Robertson's meat medium with 10% of added NaCl (Maitland and Martyn, 1948) would be valuable for isolating staphylococci from faeces. The use of selective media would increase the percentages of positive results above those reported here and might reduce or eliminate differences such as we found. It does, however, appear from our results that the combination of simple cultural methods with rough quantitative estimates would be a practicable, and possibly a useful, method in field investigations of epidemics of neonatal diarrhoea.

Summary

In order to obtain a base-line for the study of epidemics of neonatal diarrhoea simple bacteriological methods were applied to the examination of throat and rectal swabs from infants in two maternity units. During the 12 months of the investigation the incidence of infections was low.

Variations were noted in the percentages of cultures from which coliform bacilli, faecal streptococci, and aureus staphylococci were isolated. Differences were found between the flora of infants examined during the first four days of life. The incidence of aureus staphylococci was higher at times when staphylococcal infections were occurring. Coliform bacilli were more often isolated from the throats of infants who were receiving complementary or artificial feeds at the time of examination than from the throats of breast-fed infants. In cultures of rectal swabs streptococci were more often present

in excess of coliform bacilli when specimens were taken from infants receiving artificial feeds than when they came from infants who were receiving breast milk only at the time of examination. Although coliform bacilli were not isolated from some feeds and ingredients tested, the differences observed suggested that the bacilli might have been introduced with the feeds. Whether they were introduced in that way or from some other source, the higher incidence of coliform bacilli and their preponderance in the faeces of artificially fed infants may have been due to changes in the intestinal environment of these infants.

Films from rectal swabs stained by Gram's method were examined and rough quantitative estimates were made of the numbers of lactobacilli, Gram-negative bacilli, and Gram-positive cocci. Variations were found with infants of different ages and on different feeding regimes.

It is suggested that the methods used in this study might be applied to field investigations of outbreaks of neonatal diarrhoea as a preliminary to typing of organisms and that they might help to direct investigations of the source and mode of spread of infection in the infant community.

This study was planned as part of a combined clinical and bacteriological study of infections in newborn infants. We wish to thank Dr. Janet Roscoe for taking swabs and for keeping clinical records for use in the analysis of the bacteriological findings. We are also indebted to Dr. Joan Boissard for grouping some streptococci in the early part of the investigation.

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INCIDENCE OF INFECTIONS IN INFANTS IN TWO MATERNITY UNITS

BY

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Since May, 1947, all infections and illness, however trivial, occurring in the babies of two maternity units in Cambridge have been carefully recorded. Unit A took all normal obstetric bookings; Unit B took the abnormal obstetric patients. In each ward day-by-day charts have been kept of the number of mothers, the number of live births, the number of babies in the nursery, and the number of these which were premature. Any infection which has occurred among the babies, the mothers, or the staff has also been recorded on these charts. Bacteriological investigations of the infected cases were undertaken by the Public Health Laboratory Service, Cambridge. In addition throat and rectal swabs of every baby in the ward were taken at intervals throughout the year. These results form the basis of a separate report by McFarlan *et al.* (see p. 1140 of this issue).

I saw all the infected babies. A detailed analysis has been made covering the period from May, 1947, to April, 1948. The infection rate in Unit A was 8.3% (104 infected babies in 1,257 live births); in Unit B the infection rate was 10.3% (19 infected babies in 185 live births) (Table I). It should be emphasized that the slightest evidence of infection was recorded as such; the smallest single pustule, or a sticky eye if it remained sticky for longer than 24 hours, was recorded even if no pathogen was grown from the swab.

*This work was undertaken while holding a grant from the Medical Research Council.

TABLE I.—*Analysis of Infections*

	Unit A					Unit B
	By Wards				Total	
	VIIA	VIIB	IV	VI		
Eyes	20	19	20	9	68 (5·4%)	3 (1·6%)
Skin	4	12*	9	1	26*(2·1%)	8* (4·3%)
Umbilical discharge	1	—	—	—	1	—
Rhinitis	—	2*	—	—	2*	4*
Otitis media	—	—	—	—	—	3
Thrush	1	—	3	—	4	—
Pneumonia	1	—	1	—	2	—
Green stools (± vomit)	—	2	1	—	3	1
Chicken-pox	—	—	—	—	—	1
Total	27	33*	34	10	104*(8·3%)	19* (10·3%)
Live births	391	343	367	156	1,257	185

* Three babies had two infections at the same time—two in ward VIIB and one in Unit B. The totals are therefore adjusted accordingly.

Table II shows the distribution of infections in Unit A according to wards, with the number of live births, by four-week periods. It will be seen that the infections occurred more or less sporadically throughout the year, apart from a sudden increase in VIIB early in 1948, when there was a small epidemic of spots and sticky eyes at the beginning of March. This was controlled by barrier nursing precautions and the use of penicillin and sulphadimidine (sulphamezathine). None of the babies affected was ill and the nursery was not closed.

TABLE II.—*Time Distribution of Infections in Unit A*

	Total Infections	Total Births	Wards							
			VIIA		VIIB		IV		VI	
			I.	B.	I.	B.	I.	B.	I.	B.
1947										
May 18–June 14	6	87	1	23	4	27	1	37	—	—
June 15–July 12	9	100	5	37	3	25	1	22	0	16
July 13–Aug. 9	3	84	1	24	1	25	1	26	0	9
Aug. 10–Sept. 6	11	89	3	30	5	29	2	27	1	3
Sept. 7–Oct. 4	8	106	3	33	2	29	2	31	1	13
Oct. 5–Nov. 1	2	80	0	29	0	22	1	25	1	4
Nov. 2–Nov. 29	6	120	0	35	2	28	3	35	1	22
Nov. 30–Dec. 27	7	94	2	32	0	19	4	27	1	16
1948										
Dec. 28–Jan. 24	10	84	3	26	1	24	6	21	0	13
Jan. 25–Feb. 21	3	94	1	31	1	28	1	23	0	12
Feb. 22–Mar. 20	17	107	3	29	9	35	3	31	2	12
Mar. 21–Apr 17	13	118	2	36	5	31	5	32	1	19
Apr. 18–May 15	9	94	3	26	0	21	4	30	2	17
	104	1,257	27	391	33	343	34	367	10	156

I. = Infections. B. = Births.

Very few upper respiratory tract infections and no intestinal upsets amongst the mothers or staff were reported during the year under review. It seems likely that this may have been a factor in the reasonably low infection rate amongst the infants. That there was no consistent rise of infections corresponding with increased business of the ward, as shown by live births, means no more than that there was adequate staff and space for potential cross-infection to remain controlled.

In Unit A 20 infant deaths occurred during the year covered; none was attributable to infection. Post-mortem examinations were made on 10 of these. Seven of the others were very premature (2–3½ lb. (0.9–1.6 kg.) birth weight) and died within a few hours of birth; the other three had severe congenital abnormalities and died within a few days. In this unit the only infection which caused serious illness was pneumonia; two babies were affected, one being a premature infant of 3 lb. (1.36 kg.), but both eventually recovered.

In Unit B three babies recovered from one infection only to get another later; these were counted as separate infections: the total of 19 infections therefore implicates only 16 babies. These infections also were spread fairly evenly through the year. One death was attributable to infection: the baby was the eighth child of the family and obviously premature, though the dates were unreliable and birth weight was 5½ lb. (2.5 kg.). He never would suck and had to be tube-fed. When a fortnight old he suddenly lost 9 oz. (0.25 kg.) in 24 hours and showed signs of otitis media. *Staph. aureus* was grown from the throat. In spite of penicillin, sulphadimidine, and intravenous therapy for 12 days, he died. Post-mortem examination revealed pus in both mastoid cavities from which *Bact. coli* was grown. The other two cases of otitis media occurred four months later at ten days' interval; one was a premature baby of 3 lb. 2 oz. (1.39 kg.) whose ear discharged spontaneously. Neither appeared seriously upset by their infection, and both cases cleared satisfactorily.

Accommodation and Staffing

These have such an effect on cross-infection in any hospital that it is important to give details for comparative purposes. From the following description it will be apparent that the staff were working under conditions less than ideal.

Unit A

Accommodation.—Fifty-six mothers could be accommodated. Only normal cases were booked. These were divided between four wards as follows:

Ward	Mothers	Floor Area of Nursery	Potential Area per Cot
VIIA ..	14	216 sq. ft. (12 × 18)	15·4 sq. ft.
VIIB ..	14	384 sq. ft. (12 × 32)	27·4 sq. ft.
IV ..	16	1,152 sq. ft. (24 × 48)	72 sq. ft.
VI ..	12	270 sq. ft. (15 × 18)	22·5 sq. ft.

Ward VI was regarded as an overflow; it was opened in June, 1947, and was closed twice during the year under review for two or three weeks each time. It had not its own labour ward; women were therefore delivered in Ward IV or VIIA, the mother and baby then being transferred to Ward VI at once. Each ward had its own nursery in which the babies were nursed in separate cots. It will be realized that the potential cot space varied greatly in the different wards. Ward IV had plenty of space; in Wards VIIB and VI there was very little space between each cot; and in Ward VIIA the cots almost touched. All the nurseries had good windows. No provision was made for the isolation of infected or premature babies, unless by chance one of the side rooms, of which there were two each on all the wards but VI, happened to be available. Infected babies were therefore usually nursed in a corner of the nursery.

Staff.—Each ward had one sister and one staff nurse; in addition there were pupil midwives (undertaking the first six months of their C.M.B. training)—six on Ward IV and four on each of the other wards. All the nurses attended the mothers and the babies; there were no "nursery nurses" who looked after the babies and no one else. Each ward had also one nursing orderly and one charwoman. The night staff consisted of one sister, four staff nurses, three pupil nurses, and eight assistant nurses. On any one night a total of nine or 10 nurses were distributed round the four units. There was one resident house-surgeon. The medical officer lived out and paid a daily visit.

Nursery Technique.—Masks of one sort or another had to be worn by anyone entering the nursery; but in fact the mask "drill" had been somewhat neglected and masking had become perfunctory. Gowns were not worn. At birth sulphacetamide drops were instilled into the eyes; the baby was then bathed and weighed. Two days later it was bathed and weighed again, and thereafter daily. Each nursery had, next to the basin, a bathing-table covered with a mackintosh and sheet, on which the baby was placed on his own towel for bathing or changing. The basin was mopped round with "ibcol" between each bathing. The buttock ointment was kept in a communal jar but was extracted with a small square of lint, a separate piece for each baby, so that the nurses' fingers should not touch the ointment. After changing, the soiled napkins and clothes were dropped in a bucket; after feed-time these were taken to the sluice-room, where the nurses rinsed them in plain water before sending them to the common laundry. Babies were taken to and from their mothers, one under each arm, at feed-times. Mothers did not mask unless they had a cold or sore throat. There was no special routine care of mothers' breasts or hands. The nursery floors were swept once a day.

Feeding.—Until January, 1948, all babies were offered, after each breast-feed for the first three days of life, a complementary feed of a dried milk preparation which, when reconstituted, had a relatively high carbohydrate percentage. This was given by a nurse or the mother by cup and spoon. From January, 1948, two wards continued this practice, while the other two gave no complementary feeds or fluids except in special cases. When complementary or supplementary feeds were used they were made up in the ward kitchen. There was no milk kitchen. Bottles and teats were boiled in a fish-kettle on the gas-stove.

Unit B

Accommodation.—This unit was the maternity unit in the general hospital. The intention was that only abnormal obstetric cases should be admitted. There were two lying-in wards, taking six and four women respectively. The only nursery was very small (10 ft. 6 in. by 13 ft.—3.2 by 3.96 m.) with one window facing north. There were nine cots, which were packed in threes on three trolleys; the sides of the cots were touching and there was barely 1 ft. (30 cm.) floor space between the trolleys. Infected or premature babies could not be properly isolated; the bathroom (sister's office) was used in conjunction with an oxygen box as the only place available away from the nursery.

Staff.—A nursery nurse attended to the babies, but when she was off duty or needed assistance one of the pupil nurses on the unit came into the nursery to help. At night there was only one nurse for the whole unit; she attended to the mothers and babies. One ward maid "charred" for the unit. A paediatrician attended daily.

Nursery Technique.—Masks were worn in the nursery, but here again masking had become careless. There was one gown per infant, which was worn for washing or changing or artificial-feeding that infant; when taken off it was rolled up and put on top of the baby's basket on the trolley underneath the cots. These baskets were therefore closely packed. Babies were weighed at birth, again on the third day, and thereafter daily. They were bathed at birth, then "topped and tailed" daily until the cord came off, and thereafter were bathed daily. Bathing and changing were done on the nurse's lap. The floor of the nursery was polished parquet. During the daily sweep and polish the trolleys were pulled out into the corridor and the cots on them covered with a single layer of butter muslin. Otherwise the technique was similar to that described for Unit A.

Feeding.—According to the mother's condition the baby was put to the breast after 24 to 48 hours. Until then boiled water was given. This, and the artificial feeds given when necessary, were prepared in the ward kitchen. Bottles and teats were boiled in a fish-kettle on the gas-stove.

Discussion

It is interesting to compare infection rates amongst the babies of maternity units in different parts of the country from time to time. Various earlier reports (Henderson, 1943; Corner, 1946; Department of Health for Scotland, 1947) have recorded infection rates for neonatal units of

between 20% and 30%. While the present report was in progress another was published (Frazer, 1948) which is salutary to all who had been achieving rates of about 10%, for in Belfast the commendably low figure of under 3% was reached. So far as can be ascertained the criteria of infection used by each observer were similar to those employed at Cambridge.

It will be appreciated from Table III that eye infections are usually the most prevalent and skin infections next so. However, Frazer's figures and those of Unit B show skin

TABLE III.—*Records of Neonatal Infection Rates*

	Cambridge 1947–8		Edinburgh (Henderson, 1943) 1940–2	Bristol (Corner, 1946) 1944–5		London St. Helier* 1945	Belfast (Frazer, 1948) 1946–7
	Unit A	Unit B		A	B		
Total live births	1,257	185	8,075	3,344	3,190	1,293	2,274
Total infections	8·28%	10·28%	29·8%	25·9%	29·7%	21%	2·77%
Eye infections ..	5·4%	1·62%	15·9%	13·49%	17·6%		0·61%
Skin infections	2·06%	4·32%	6·8%	6·58%	10%		1·58%
Thrush ..	0·32%	0	4·9%				0·35%

* Department of Health for Scotland Report, 1947, p. 24.

infections to be nearly three times more common than eye infections. It is therefore interesting to conjecture whether the covering of the cot with gauze as practised by Frazer, which minimizes dust-borne infection, and the removal of the babies during the cleaning of the ward in Unit B in Cambridge had any part in the reversal of the usual finding.

The incidence of infections in hospital nurseries must be related to the quality and number of staff available. However, it would also seem likely that the architectural arrangements of the unit are of great importance. In the Belfast Maternity Home (Frazer, 1948) the basic units accommodated five or six mothers and babies, and the number of deliveries was such that a unit could be filled within 24 hours, allowing a thorough cleaning and airing of each unit for 24 hours between each intake. These arrangements would seem to be a factor in reducing cross-infections. These small units are very different from the large nursery for 50 babies described by Corner, even though the Bristol nursery was partially divided into three sections. In the Edinburgh nurseries, on which Henderson reported, a large number of babies are also collected in one room (personal communication).

These observations suggest that one way of reducing the hospital neonatal infection rate would be to reduce the number of babies in each nursery unit. By reducing the infection rate among newly born infants the death rate from infection in this age group should also be reduced. Infections are responsible for over 25% (Department of Health for Scotland, 1947) of neonatal deaths, and they are the most readily preventable cause.

I would like to thank Dr. Allan McFarlan, Dr. French, and the staff of the County Maternity Unit for their help and co-operation.

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THE RELATION OF STAPHYLOCOCCUS PYOGENES TO INFANTILE DIARRHOEA AND VOMITING*

BY

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The aetiology of infantile diarrhoea and vomiting remains obscure despite the efforts of many investigators. Amongst the many suggested causative bacterial agents mentioned is the staphylococcus. The purpose of this paper is to present the findings in an investigation to determine whether *Staphylococcus pyogenes* was a possible direct cause of the gastro-intestinal condition. The staphylococcus in relation to parenteral infection as a cause of diarrhoea and vomiting is not considered.

Draper and Brown (1946) recorded the presence of *Staph. aureus* in the stools in 26.5% of infants aged 0–1 year suffering from enteritis. One death occurred, in a child 8 months of age who had had a history of diarrhoea for six weeks before admission to hospital and died nine days later; the faeces contained pus and mucus. Felsen and Wolarsky (1942) reported an outbreak of epidemic diarrhoea of the newborn in 19 babies; they found *Staph aureus* in pure culture in two cases, and it was the predominating organism in a third case. These authors suggested that the presence of *Staph. aureus* was significant, but they were uncertain whether their evidence was sufficient to incriminate any single bacterial agent. Kramer (1948) reported a fatal case of enteritis in a child aged 6 weeks, and described the condition as one of staphylococcal enteritis on the finding of a coagulase-positive streptomycin-resistant *Staph. aureus* from the terminal ileum at necropsy. *Staph. aureus* was not cultured before the child's death.

Crowley *et al.* (1941), in their investigation of epidemic neonatal diarrhoea in maternity hospitals, found a coagulase-positive *Staph. aureus* in two cases in a series of 10 infants. They concluded from the evidence that there was nothing to justify the claim that the staphylococcus was anything more than a possible cause in some outbreaks. Taylor *et al.* (1949), in a series of 19 babies in two outbreaks of infantile diarrhoea and vomiting, found *Staph. pyogenes* in the stools on six occasions, and showed by phage-typing that the staphylococci did not belong to the types commonly present in staphylococcal food-poisoning. Because they found a low incidence and a sparsity of staphylococci in rectal swabs they discontinued further phage-typing.

The incidence of staphylococci in the stools of normal infants has been recorded by Duncan and Walker (1942), who found *Staph. aureus* in 74.4% of 61 newly born infants (method of isolation not stated), and by Martyn (1949), who, using a selective medium for the isolation of staphylococci, reported the presence of *Staph. pyogenes* in 50% of 130 healthy infants aged 0–7 days. Crowley *et al.* (1941) isolated *Staph. aureus* once in 57 normal breast-fed infants aged 3–23 days.

*This work was undertaken whilst holding the Cow and Gate Research Fellowship in Child Health, University of Manchester.

The Present Investigation

This paper records the results of an investigation into the incidence of *Staph. pyogenes* in the stools (*a*) of infants in hospital suffering from diarrhoea and vomiting, (*b*) in infants in hospital not suffering from gastro-intestinal symptoms, and (*c*) in a number of healthy babies attending a child-welfare clinic. The last two groups were examined to serve as controls.

All the infants in this series were aged between 2 weeks and 1 year. The majority of them were in the age group 1–3 months. The investigation was carried out between October, 1948, and July, 1949, and includes cases from four hospitals.

Bacteriological Methods.—Rectal swabs from the infants were plated as soon as possible after collection on horse-blood-agar plates and inoculated into a 10% NaCl meat medium recommended by Maitland and Martyn (1948) as being selective for staphylococci. All staphylococci isolated were tested for coagulase production; all positive strains are referred to as *Staph. pyogenes*, and these strains were tested for sensitivity to penicillin (40 units per ml.) and streptomycin (1,000 units per ml.), using soaked strips of filter-paper laid over 18-hour broth-culture streaks of the organism on agar plates. In addition all *Staph. pyogenes* strains were bacteriophage-typed, using the series of phages in routine use at the Central Public Health Laboratory, London. The strains classified as non-typable were tested against all the staphylococcal phages. In every case strains were tested against Kreuger phage.

Results of Culture.—Cultures were made from 119 infants with diarrhoea and vomiting, from 78 infants in hospital with no gastro-intestinal symptoms, and from 44 healthy infants attending a child-welfare clinic. The results are summarized in Table I. The incidence of *Staph. pyogenes* in cases (44.5%) and in controls (46%) showed a close similarity. There was a low incidence of streptomycin-resistant strains, only four being isolated. The frequency of penicillin-resistant strains was little different in cases and controls in hospital, but was higher in the out-patient controls; the difference is not, however, statistically significant. In Table II the incidence of bacteriophage types of the *Staph. pyogenes* strains isolated is recorded; the nomenclature, as already stated, is that used by the Central Public Health Laboratory. The distribution of types and the proportion of non-typable strains was similar for cases and controls. It is noteworthy that one type (47) accounted for almost half the typable strains. This type was also found to be prevalent in the staphylococci isolated from healthy newborn infants (Martyn, 1949), the strains having been typed after publication, and nearly all these type 47 strains were penicillin-resistant. Of the 38 strains of phage type 47, 26 were penicillin-resistant. Type 6/47 is recorded five times in the two groups: this type has been shown by Allison (1949) to be often associated with staphylococcal food-poisoning. There were 20 non-typable strains.

TABLE I.—*Incidence of Staph. pyogenes in Cases of Infantile Diarrhoea and Vomiting and in Controls, with Results of Sensitivity to Penicillin and Streptomycin*

Source	Cases of Infantile Diarrhoea and Vomiting	Controls		
		In-patient	Out-patient	Total
Total Nos. of cases ..	119	78	44	122
Staph. pyogenes isolated	53 (44·5%)	41 (52·5%)	15 (34%)	56 (46%)
Penicillin-resistant ..	15 (28·3%)	13 (31·9%)	9 (60%)	22 (43·9%)
Streptomycin-resistant	2	2	0	2

TABLE II.—*Incidence of Phage Types in Strains of Staph. pyogenes Isolated from Cases of Infantile Diarrhoea and Controls*

Source of *Staph. pyogenes*	Numbers of Phage Types											
	Not Typable	6	6/47	31	47/53	47/54	47	47B	52	52A	53	54
Cases of diarrhoea and vomiting (53 strains) ..	11	1	5	1	2	4	19	2	2	3	2	1
Controls (56 strains)	9	2	5	3	1	2	19	1	6	0	4	4

Discussion

The presence of *Staph. pyogenes* in the stools of 44.5% of infants suffering from diarrhoea and vomiting and in 46% of controls who either were not suffering from diarrhoea and vomiting or were normal, the close similarity of phage-type distribution in the two groups, and the close correlation of sensitivity to streptomycin and penicillin do not seem to indicate that the organism bears any causal relationship to infantile diarrhoea and vomiting.

The use of a highly selective medium for the isolation of *Staph. pyogenes* from the stools explains the high incidence of the organism, as on only four occasions was *Staph. pyogenes* isolated direct on blood agar—twice in cases and twice in controls.

There were 13 deaths recorded in children examined bacteriologically; in four of these *Staph. pyogenes* was isolated, but then only as a result of using the selective salt–meat medium. It should be mentioned that the number of staphylococci in the original inoculum was not known. In cases and controls in which *Staph. pyogenes* was present there may have been fewer than 10 organisms, because, as Maitland and Martyn have shown, the salt–meat medium will detect small numbers of staphylococci when mixed with large numbers of other bacteria. The failure to isolate staphylococci direct on blood agar, except in four instances, suggests that the number of staphylococci present in the stools is very low. The failure of cases to respond to streptomycin therapy (Holzel, Martyn, and Apter, 1949) does not suggest that an organism nearly always found to be sensitive to the antibiotic *in vitro* bears any causal relationship to the disease. None of the cases in this investigation were found to have either blood or pus in the stools as did many of the cases recorded by Draper and Brown (1946): whether they were dealing with the same clinical condition is a matter of conjecture.

If consideration is given to all the data available there seems to be no evidence that *Staph. pyogenes* bears any direct causal relationship to infantile diarrhoea and vomiting.

Summary

A bacteriological investigation of the incidence of *Staph. pyogenes* was carried out in cases of infantile diarrhoea and vomiting and in infants not suffering from any gastro-intestinal abnormality.

Staph. pyogenes was isolated from 44.5% of the stools of 119 cases of diarrhoea and vomiting and from 46% of controls. Only four streptomycin-resistant strains were encountered in 109 strains of *Staph. pyogenes* tested.

Bacteriophage types were distributed evenly in the two groups. Type 47 predominated, being found in 35% of the total number of strains tested. A food-poisoning type (6/47) was found five times in each of the two groups. The relationship of *Staph. pyogenes* to infantile diarrhoea and vomiting is discussed, and the general conclusion is drawn that this organism bears no relationship to the disease.

I wish to thank Professor Gaisford for his interest and advice, and to acknowledge my thanks to Professor Maitland for his help and criticism, to Dr. R. E. O. Williams and Miss J. Rippon, of the Central Public Health Laboratory, for sending me staphylococcal phages and propagating strains, and to Mr. K. Boulter for technical assistance.

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MORTALITY AND SURVIVAL RATES IN MALES WITH SILICOSIS OR SILICO-TUBERCULOSIS

BY

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Whilst the literature on silicosis and silico-tuberculosis is voluminous, there are few published data on the expectation of life in these two conditions. So far as silico-tuberculosis is concerned, as the prognosis is obviously dominated by the tuberculous element its assessment is not unduly difficult to the experienced chest physician. The necessity for data is much greater in silicosis without tuberculosis, as the question of expectation of life may be raised in connexion either with life insurance or with compensation, but most physicians see too few cases to establish criteria. The data upon which this paper is based have been accumulated by one of us (H.M.T.) in Sheffield during the last 19 years; the statistical analysis is the work of the co-author (W.J.M.).

Sheffield is traditionally the home of the grinder, but it is perhaps not so well known that a number of other trades in Sheffield also carry an occupational hazard of silicosis. These trades are sand- and shot-blasting, fettling steel, steel-dressing, ganister mining and quarrying, ganister-crushing, silica-brick making, building, repairing, and scaling furnaces lined with silica bricks, stone-masonry and stone-dressing, and finally coal-mining. Records have been accumulated of 857 men in whom some degree of silicosis or of silico-tuberculosis has been diagnosed. Of these 43 had no opportunity of reaching the age of 40 years, and have been excluded. The series therefore consists of 814 men with silicosis or silico-tuberculosis each of whom reached the age of 40 years and had the opportunity of reaching the age of 41 or more.

The reasons for the selection of 40 as the commencing age in the series are as follows. Silicosis is a condition which develops gradually as a result of an occupational hazard over a period of years. The proportion of cases in which it is possible to diagnose silicosis with certainty below the age of 40 varies in different processes, but is comparatively small. After the age of 40 this proportion increases fairly rapidly. Nevertheless, even before the lung changes have progressed to diagnostic level on a radiograph, they have from a pathological point of view been initiated and such risks to health as may be associated with silicosis have started to operate. With the same line of argument, it appears logical to credit a case in which silicosis was first diagnosed at the age, say, of 52 with survival from age 40 to age 52, because there can be no doubt that the silicotic hazard has existed continuously since the age of 40. It is necessary to have some standard with which comparison of the survival rates in silicosis and silico-tuberculosis can be made. For this purpose the data in the English Life Table No. 10 (Registrar-General, 1931) have been used. From the "lx" column a percentage survival rate for ages over 40 has been calculated. This represents the survival rates for males in England and Wales starting at age 40.

Survival rates at ages over 40 for silicosis and silico-tuberculosis together with the control survival rates are given in Table I and expressed graphically in the Chart.

TABLE I.—*The Number of Survivors at Each Age Expressed as a Percentage of the Number at Age 40*

Age	Silico-tuberculosis (466 Men)	Silicosis (348 Men)	English Life Table No. 10 (1930–2)
40	100	100	100
41	98·7	99·4	99·4
42	97·2	99·1	98·8
43	95·3	98·6	98·2
44	94·0	98·3	97·5
45	91·8	97·7	96·8
46	89·2	97·4	96·0
47	87·0	96·5	95·2
48	84·3	95·8	94·3
49	81·9	94·2	93·4
50	78·1	92·6	92·4
51	75·3	90·9	91·4
52	72·6	87·6	90·3
53	69·2	86·6	89·1
54	66·9	84·5	87·9
55	63·6	80·0	86·5
56	59·9	76·8	85·1
57	55·6	72·5	83·7
58	50·1	70·6	82·1
59	44·7	66·0	80·4
60	39·7	61·4	78·6
61	35·3	57·7	76·7
62	31·4	53·5	74·7
63	25·7	49·2	72·5
64	22·2	44·9	70·3
65	20·0	40·3	67·8
66	16·3	36·5	65·3
67	14·6	30·6	62·5
68	12·1	26·6	59·7
69	9·0	21·4	56·7
70	5·7	18·0	53·6
71	4·5	16·3	50·3

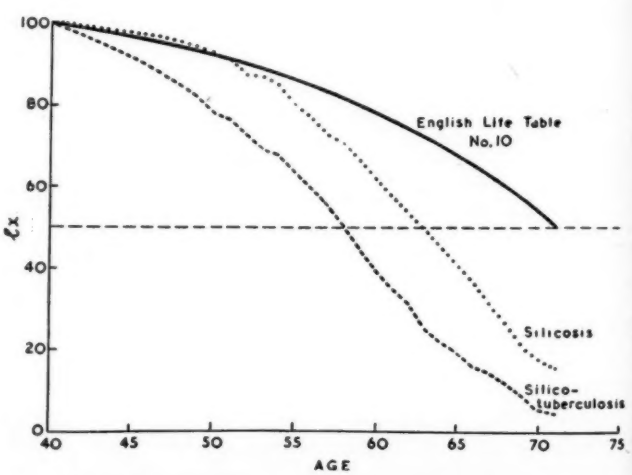

Chart showing percentage of survivors from age 40.

Before considering these findings it is necessary to give further information with regard to the series upon which the analysis is based. The 814 cases divide into 466 in which silicosis accompanied by tuberculosis was diagnosed and 348 in which silicosis without tuberculosis was diagnosed (referred to below as "pure silicosis"). All cases in which a diagnosis of tuberculosis was made at any time are in the group of silico-tuberculosis. It is interesting to note, however, that the group of pure silicosis cases was a relatively stable group, and only 23 cases were first diagnosed as pure silicosis and later developed tuberculosis. In this series, therefore, the chances of a case originally diagnosed as pure silicosis later developing tuberculosis were 6 in 100. The 23 cases included a man diagnosed as a case of heavy silicosis at the age of 69 who developed acute tuberculosis one year later, and a man aged 62 who developed tuberculosis at the age of 63. The other 21 cases ranged in age from 33 to 57 (average 46 years) when silicosis was first diagnosed. The average age at which tuberculosis was diagnosed in these 21 cases was 54 years.

Of the 814 cases in the whole series 610 (75%) have been followed till death occurred; the remainder, with the exception of 15 cases which "left the area" or were "lost sight of" at various ages, are still alive. These 15 cases drop out of the survival table at the age at which they were last known to be alive. The distribution of the series between various occupations is given in Table II. It will

TABLE II.—*Distribution of the Cases Between Various Occupations*

Occupation	Silico-tuberculosis		Pure Silicosis		Totals
	Alive	Dead	Alive	Dead	
Grinders	49	280	52	140	521
Fettlers and steel-dressers	9	32	19	24	84
Coal-miners	8	15	24	16	63
Masons and stone-dressers		21	1	20	42
Ganister-workers, quarry, mine, crushers, etc. ..	3	14	11	11	39
Sand- and shot-blasters ..	3	12	8	5	28
Furnace builders and repairers	6	5	4	4	19
Miscellaneous	4	5	3	6	18
Totals ..	82	384	122	226	814

be noticed that the ratio of silico-tuberculosis to pure silicosis varies in different trades. Thus of 521 grinders 329 (63%) had silico-tuberculosis, of 84 fettlers and steel-dressers 41 (49%) had silico-tuberculosis, whilst of 63 coal-miners only 23 (37%) had silico-tuberculosis. The appreciably lower proportion of silico-tuberculosis in coal-miners is in line with the experience of other workers. Fletcher (1948) discusses at some length the relation of tuberculosis to the pneumoconiosis of coal-miners, and sums up by stating that clinically tuberculosis appears as an infrequent but often serious complication of the disease.

Clinical experience in Sheffield supports the view that the prognosis so far as tuberculosis is concerned in the silico-tuberculosis of coal-miners is better than the prognosis of comparable cases in grinders. Gardner and others (1930) cited experimental evidence in favour of the theory that the dust from coal may exercise a favourably modifying effect on the development of tuberculosis. Reference has been made elsewhere (Turner, 1939) to the fact that, quite apart from the question of silicosis, the incidence of sputum-positive pulmonary tuberculosis among coal-miners in the Sheffield area is not high, and that, moreover, it shows an absence of the middle-age peak in the age-incidence curve which is a characteristic feature in the age-incidence curve for occupations unfavourable with regard to tuberculosis. Cummins (1935) suggested that coal dust in a miner's lung acts as an adsorbent of tuberculin and in so doing reduced the toxicity of any lesions which may occur. This theory and the work of Cummins and Weatherall (1931) upon which it is based must be accorded considerable weight.

The very high proportion of grinders who develop tuberculosis with silicosis has in the past been attributed to the harmful effect of silica together with the bad working conditions that have prevailed in the industry. It is, however, well to bear in mind that grinders and sand- and shot-blasters are abrading steel and may well also inhale fine particles of the metal. Tuberculosis is a common complication of the sidero-silicosis found in haematite miners. Stewart and Faulds (1934) gave details of post-mortem findings in 15 haematite miners, and in 11 of these the lungs showed evidence of tuberculosis accompanying the sidero-silicosis. It is possible, therefore, that the presence of iron in the lungs may exercise an unfavourable effect on local tissue resistance to tuberculosis.

Discussion of Findings

As would be expected, the survival curve for silico-tuberculosis shows the greater deviation from the control survival rates, and this deviation begins in the first year of risk. Tuberculosis with or without the mention of silicosis is the cause of death in the majority (313 of 384 deaths in this group were due to tuberculosis). At the Johannesburg Conference (Gardner and others, 1930) the question was put, "What is the prognosis in a case of silicosis with tuberculosis?" The agreed answer was, "This is always serious; it is worse (1) when the tuberculous infection occurs at the outset of the silicosis, (2) in younger than in older subjects, (3) than in cases of tuberculosis alone." Clinical experience in Sheffield endorses this answer, with a reservation on its second part. When tuberculosis either first manifests itself or recrudesces in later life it is often of an acute type with a rapid downhill course.

One handicap in the treatment of silico-tuberculosis is that collapse therapy is rarely either indicated or helpful. There are several reasons for this. The majority of the patients are in their fifth or sixth decade, and there is often difficulty in judging the contralateral lung both with regard to its functional capacity and also to the presence of active tuberculous lesions. It is probably the almost invariable reduction in cardio-respiratory capacity, due partly to concomitant emphysema, which is the main contraindication and which is responsible for disappointments when collapse therapy is tried. In favourable circumstances with conservative treatment, particularly in the middle-age group, there is a tendency for the disease to assume the productive form, and such cases may survive for many years without ever achieving complete quiescence, but with only moderate disability. In a small proportion complete arrest of the tuberculous disease is obtained, but even so life is usually shortened because of damage to the cardio-respiratory function. In view of the generally poor prognosis in cases of silico-tuberculosis where the disease is in the exudative phase, and the general lack of application of collapse therapy, experiments with streptomycin would be justified. One such case can be quoted.

A steel-dresser was first seen in 1931, at the age of 39, when he had slight silicosis. He continued at his trade and in 1943 was seen again, and an *x*-ray film showed moderate silicosis. In 1946 the position remained unchanged. In November, 1948, at the age of 57, he had a febrile illness, diagnosed as a broncho-pneumonia localized to the left lower zone. As his recovery was slow he was referred to the chest clinic, and proved to have a localized exudative tuberculous lesion in the left lower

lobe, with tubercle bacilli in the sputum; there was moderate silicosis of both lungs. He was admitted to a sanatorium and given 1 g. of streptomycin daily for 60 days. Within three weeks the sputum disappeared and a radiograph showed diminution of the mottling in the left lower lobe, suggesting that the exudative reaction had ceased and that the absorptive and productive phase had started. Six months after the beginning of treatment he was able to return home, with the tuberculous process apparently quiescent, general condition excellent, and B.S.R. 6 mm. in the hour.

Turning to pure silicosis, it will be noticed that the survival rates up to the age of 51 years are almost identical with the control rates. Thereafter the silicosis group shows a definite adverse deviation which increases year by year, until by the age of 65 the survival rate is 27% below the control and only 20% above that for the silico-tuberculosis group. These findings indicate that pure silicosis is associated with a definite decrease in expectation of life as compared with males in the community at large. Table III

TABLE III.—*Cause of Death in 610 Cases*

Cause of Death	Grinders	Fettlers and Steel-dressers	Coal-miners	Other Trades	Totals
Pulmonary tuberculosis	222	31	14	46	313
Silicosis	62	8	3	19	92
Bronchitis	38	5	5	8	56
Pneumonia	12	3	5	7	27
Cancer:					
Lung and mediastinum	19	3	2	8	32
Oesophagus	3				3
Stomach	3				3
Colon			1		1
Rectum	1			1	2
Larynx	1				1
Prostate	1			1	2
Other sites	2			4	6
Cerebral haemorrhage	10		1	1	12
Arteriosclerosis	7			2	9
Chronic nephritis	3			2	5
Coronary disease	4	2		1	7
Heart failure	6			1	7
Hypertension	2				2
Cerebral thrombosis	3				3
Suicide	2				2
Appendicitis	1	1		1	3
Infective endocarditis	1			1	2
Accident and violence	1	2			3
Rupture of heart	1				1
Acute intestinal obstruction	1				1
Diabetic coma	1				1
Occlusion of mitral valve	1				1
Cirrhosis of liver	1				1
Amyotrophic lateral sclerosis	1				1
Gastric ulcer and haematemesis		1			1
Pulmonary embolism	1				1
Prostatectomy	1				1
Infarction of bowel	1				1
Cause unknown	7				7
Totals	420	56	31	103	610

shows that, excluding the 313 deaths due to pulmonary tuberculosis, 209 (70%) of the remaining 297 deaths were due to respiratory conditions. In clinical experience, also, the effects of silicosis and its frequently concomitant emphysema and bronchitis on the cardio-respiratory function begin to become more apparent with each passing year after the age of 50. Shortness of breath on exertion causes some limitation of activities in the majority of silicotics by the age of 55, and in some this reduction of cardio-respiratory function constitutes the salient feature of the clinical picture. How much of this disability is due to emphysema and loss of elasticity of the lungs and how much is due to changes in the pulmonary circulation and the right heart is a matter meriting further study. There is, however, little doubt that the resistance of elderly men with silicosis to respiratory infections is less than could reasonably be expected. When pneumonia occurs in men with silicosis it is serious, and radiological residua are common in survivors. These residual shadows are probably due to persisting lobular or segmental collapse.

One other cause of death which deserves further reference is cancer of the lung. 32 (11%) of 297 deaths from causes other than tuberculosis were due to cancer of the lung, and there was one death from cancer of the larynx. Of the deaths from cancer of the lung 19 occurred in grinders, which suggests a heavy incidence in this group of workers when account is taken of the toll exacted by tuberculosis before the cancer age period. Although no statistical significance attaches to such small figures, their trend supports findings in a previous investigation into the cancer mortality in certain Sheffield trades (Turner and Grace, 1938). This significantly excessive mortality from cancer of the respiratory tract was found in engineers, foundry workers, and grinders, but in none of the other occupational groups investigated. Kennaway and Kennaway (1936) discuss the question whether there is any association between silicosis and cancer of the lung. They show that metal-grinders have a high rate for cancer of the lung, while stone-masons show only a slightly increased rate, and conclude that the factors which lead to silicosis are not active in producing cancer of the lung or larynx. It may possibly be that the inhalation of metal dust in the grinding process is of more importance in this connexion than the inhalation of silica. Brockbank (1932), in a survey of primary intrathoracic cancer, gave full occupational details for 52 male cases, and 13 of these had worked with iron and steel.

It has been shown that expectation of life is reduced in both silico-tuberculosis and pure silicosis, and it may be helpful to express this reduction quantitatively. If the expected age at death in each group is taken to be the age at which the living members equal those who have died, or, in other words, the age at which the chances of being alive or dead are equal, it will be found that under the conditions of this investigation the expected age at death for silico-tuberculosis is 58, for pure silicosis 63, and for males in the general population 71 years. Thus from age 40 there is a reduction in expectation of life of 13 years for the silico-tuberculosis group and of 8 years for the pure-silicosis group.

Summary

Survival rates at ages over 40 in a series of 814 men with silicosis or silico-tuberculosis have been calculated.

It has been shown that survival rates for males with silico-tuberculosis compare very unfavourably at all ages over 40 with the rates for males with pure silicosis or with the control rates for males in the general population. There is a reduction of 13 years in the expectation of life at age 40 for the group with silico-tuberculosis.

Up to age 51 the survival rates for males with pure silicosis are similar to those of males in the general population. After the age of 51 there is an adverse deviation in survival rates for the group with pure silicosis. This results in a decrease in expectation of life of eight years from age 40, as compared with the expectation of life of males in the general community. It is suggested that this is due to the effects of silicosis on cardio-respiratory function and on the capacity to resist respiratory infections.

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PARAFFIN PNEUMONIA

BY

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It is not uncommon for cases of paraffin (kerosene) poisoning to be admitted to the children's ward of the Salisbury Native Hospital. Since paraffin has many interesting effects, particularly on the respiratory tract, I consider it of general interest to describe the clinical picture that such ingestion might produce. Further recognition of the disorder may easily be overlooked, although doctors practising amongst Africans may be well aware of the consequences of this accident.

The condition is seen particularly among infants living in native compounds, where the paraffin lamp is used for lighting. When the lamp is filled, the remaining paraffin is sometimes not emptied back into the bottle but left in a mug. It is not difficult to appreciate the danger of such a practice, as the crawling infant may easily snatch the container and consume its contents. The child coughs and cries; the mother is alarmed and rushes him to the hospital, where, as a rule, after the stomach is washed out he is admitted for the night.

The infant's condition is usually satisfactory, though there will be some rise in temperature, with the presence of a cough. In most cases the child is not very ill; but certain physical signs, such as an impairment of the air entry and inspiratory crepitations in the affected parts of the lungs, may be evident. Dullness and tubular breath sounds will not be present unless the patch is large. In most cases the lesions are found in one or both regions of the lower lobes of the lungs.

A radiograph taken at this stage of the illness, about 24 to 36 hours after the onset, generally reveals areas of "cotton-wool" opacities of small irregular size. In the more extensive cases, however, the lesions are lobar or lobular in appearance. They may be unilateral or bilateral.

The fever usually lasts a few days, the temperature then gradually returning to normal. At the height of the fever the respiratory rate may be increased as well as the pulse. The temperature generally varies from 100 to 103° F. (37.8–39.4° C.). So far I have not encountered any fatal cases or sequelae; all the patients made an uninterrupted recovery.

The differential diagnosis of paraffin poisoning is that of any acute respiratory affection, such as acute bronchitis or pneumonia. Malaria and acute febrile states may have to be considered also.

Illustrative Cases

Case 1.—A native male infant aged about 1 year was admitted on January 1, 1949, with a history of having drunk some paraffin the previous night. The mother did not know what amount had been taken, but believed it was not much. The child coughed and attempted to vomit. He was a well-covered child. The temperature was 99.7° F. (37.6° C.); the next evening it had risen to 101° F. (38.3° C.), after which it gradually subsided, reaching normal a few days later. On admission the pulse rate was 140 and the respiratory rate 36 a minute, dropping to 130 and 24 respectively after four days. On examination of the chest tubular breathing was audible in the left base, moist crepitations over the same area being heard later. The rest of the physical examination was negative. The white cell count was 13,100, with 60% neutrophils, 33% lymphocytes, and 7% monocytes. No malaria parasites were found in smears prepared from the peripheral circulation. On admission the stomach was washed out, when the smell of paraffin was detected. No special treatment, such as the use of penicillin or sulphonamides, was given. A radiograph taken on January 26 showed a large area of homogeneous consolidation at the left base, with a more extensive zone of mottled densities in the corresponding area of the right lung.

Case 2.—A native female infant aged about 1 year was admitted on April 25, 1948, with a history of having consumed 2 oz. (57 ml.) of paraffin that day. On admission the temperature was 102° F. (38.9° C.) and the child was slightly dyspnoeic. The temperature varied from 100–102° F. (37.8–38.9° C.) for the next three days, after which it gradually subsided to normal. Physical examination revealed inspiratory crepitations, mostly at the right base but with a few on the left. The mouth and throat were normal, the abdomen was slightly protuberant, and no enlargement of the spleen or liver was detected. The heart was normal, and no abnormal changes were noted in the nervous system. The urine was clear of albumin and sugar. Peripheral blood smears were negative. A radiograph of the chest taken on April 27 showed a soft area of consolidation in the lower zone of the left lung. On April 29 the child was discharged as fully recovered.

Case 3.—A native male infant aged about 15 months was admitted on December 6, 1948, with a history of having accidentally swallowed 2 oz. (57 ml.) of paraffin, after which he had vomited three times. On admission he was coughing, and paraffin could be smelt in the breath. The temperature was 103° F. (39.4° C.). He was given a gastric lavage. Examination of the chest revealed crepitations at the left base with bronchial breathing. Nothing else of note was found in the lungs. The mouth, throat, heart, abdomen, and central nervous system all appeared normal. No malaria parasites were found in smears taken of the peripheral blood. The total white cell count was 15,600 (43% neutrophils, 49% lymphocytes, 5% monocytes, and 3% eosinophils). The patient made a rapid recovery, the temperature returning to normal within three days.

Case 4.—A native female infant aged about 1 year was admitted on February 16, 1949, with a history of having swallowed paraffin a few hours previously. According to her mother, the amount consumed was about 1 oz. (28 ml.). On admission her temperature was 104° F. (40° C.), pulse 130, and respirations 30. She coughed, but no physical signs were observed in the lungs. A gastric lavage was given soon after admission. A radiograph taken the following day revealed a patchy consolidation in the lower zone of the left lung. The child was given 20,000 units of penicillin three-hourly by intravenous injection and 0.25 g. of sulphadiazine four-hourly by mouth. The temperature subsided rapidly, and two days after admission she had fully recovered and was discharged.

Case 5.—A native female infant aged about 15 months was admitted from the Location Dispensary by Dr. L. Stern, having swallowed paraffin on the afternoon of the previous day. She became very restless and later feverish. The next morning she vomited and developed a cough and some diarrhoea. Later, on admission (February 11, 1949), the temperature was 102° F. (38.9° C.) and she was coughing. The mouth and throat were healthy and the abdomen normal. The urine was free of sugar and albumin. The central nervous system was normal. The lungs did not reveal any gross changes on physical examination, but a radiograph showed a well-marked lobar consolidation of the upper zone of the right lung. The stomach was not washed out. The fever gradually subsided to normal after about six days and the patient was discharged.

Discussion

The literature, especially from America, contains a number of references to paraffin poisoning and pneumonia. Barbour (1926) reported four cases, one of which was fatal. Another fatal case was recorded by Higgins (1933), who suggests that the serious sequelae following the ingestion of paraffin are due to pulmonary involvement from aspiration of the liquid into the lungs. Waring (1933) emphasized the frequency of this type of poisoning. Some of his experiments on dogs tended to show that the pulmonary

involvement was due to aspiration of the paraffin direct or by regurgitation from the stomach into the lungs. Clinically, 9 (39%) out of 23 patients developed pulmonary changes varying from mild bronchitis to a fatal pneumonia.

Nunn and Martin (1934) recorded their findings in a series of 65 cases. These showed that 43% of the cases had aspirated some of the paraffin into the lungs. There was a mortality of 9%, all the fatal cases showing evidence of a pneumonitis. Fatalities occurred within the first 18 hours after ingestion. These authors therefore concluded that the prognosis was directly proportional to the amount of hydrocarbon entering the lungs. Their conclusion that all fatalities occurred within 18 hours after the ingestion of paraffin was corroborated by Farabaugh (1936) when he reviewed the various reports on cases of paraffin poisoning found in medical literature.

From experimental work on rabbits, Lesser, Weens, and McKey (1943) concluded that the pulmonary manifestations in these animals were due to aspiration of paraffin into the lungs rather than to its absorption from the gastro-intestinal tract. No changes were noted in the lungs of rabbits given varying amounts of paraffin by stomach tube. However, when the paraffin was administered by means of a tracheal catheter, pulmonary oedema and, later, confluent pneumonia were seen. Of a series of 22 cases of paraffin poisoning studied radiographically, 17 (77%) showed pulmonary changes.

Similar experiments on the action of paraffin on the lungs were reported by Deichmann *et al.* (1944). After administering it to rabbits by mouth or intraperitoneally they concluded that the vascular damage through absorption in the blood stream accounted for changes in the bronchi, and that the pathological lung changes were of the same character whether the paraffin was given by stomach tube or by intraperitoneal injection. In view of lung manifestations due to paraffin carried via the blood stream as well as from direct contact resulting from aspiration, these investigators stressed the necessity for early and efficient removal of all traces of the oil from the gastro-intestinal tract in the emergency treatment. They also showed that the percentage of deaths from the same dose of paraffin varied from *nil* with highly purified paraffin to as much as 60 with less-purified products.

About the same time Scott (1944) reported what he considered to be the first case in the literature of pneumonia, pneumothorax, and subcutaneous emphysema complicating paraffin poisoning. A similar case was recorded by Lavenstein in 1945.

Steiner (1947) paid particular attention to the clinical picture. He claims that there is an acute intoxication with evidence of cerebral depression, particularly of the vagus and respiratory centres. In most cases recovery takes place in a few days. Many who ingest paraffin develop changes in the lungs, detectable clinically or radiographically. These changes vary from slight infiltration "to more serious complications." Steiner classifies the cases into three groups on the basis of severity and complications: (1) acute toxicity and depression of the central nervous system, with minimal pulmonary changes followed by rapid recovery; (2) severe pneumonia and hyperpyrexia, with prolonged recovery; (3) severe pneumonia, with evidence of degenerative changes in the myocardium, liver, kidneys, and gastro-intestinal tract.

According to Steiner, the central nervous system of infants is sensitive to paraffin. Absorption from the stomach is rapid and likely to produce symptoms within an hour after an accident. These include a rapid and feeble pulse, shallow respirations, cyanosis, and drowsiness, with occasional muscular twitchings. Most infants soon recover from these effects. The lungs, however, are often involved (Group 1). In Group 2 stupor or coma with high fever and more marked changes in the lungs (confluent pneumonia) are seen. In Group 3 the degenerative effects of absorbed paraffin on the liver, spleen, kidneys, and myocardium are superimposed on the toxicity and pneumonia. He describes a case with auricular fibrillation and flutter.

Steiner discusses the two reasons given for the production of the various syndromes—absorption via the blood stream and/or aspiration direct into the bronchi. Clinically, it appears that absorption of paraffin from the stomach has enough pathological potentiality to warrant its prompt removal by gastric lavage. Yet, while such removal has been advocated in the emergency treatment, the development of gastric hyperaemia and occasional multiple erosions of the gastric mucosa necessitate the exercise of caution during this procedure. In evaluating the outlook Steiner stresses the following: (1) age—infants are more susceptible than adults; (2) amount ingested; (3) the extent of vomiting and aspiration; and (4) the nature and rapidity of the emergency treatment.

Clinically, it is clearly difficult to state whether the pneumonic changes are due to aspiration of the liquid into the lungs in the first instance or to absorption of the paraffin from the stomach and its eventual settlement in the lungs. In most cases the radiograph reveals basal changes, thus favouring ingestion. It will be noted that in Case 5 of the present series the upper lobe of the right lung only was involved. This might be considered to favour gastric absorption rather than aspiration direct into the lungs.

Steiner claims that the central nervous system of the infant is particularly sensitive to paraffin, but in no case that I have yet seen has there been any undue central nervous depression.

Summary

Cases of paraffin pneumonia in Southern Rhodesia are reported and the clinical features described.

The prognosis, as a rule, is good, although fatal cases are on record in the literature.

In view of the complications of paraffin poisoning it is advisable to admit all cases to the ward for observation.

My thanks are due to Dr. R. M. Morris, Secretary for Health, Southern Rhodesia, for his permission to publish this paper.

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A new Health Sciences Building at the University of Washington was formally opened on October 9. It houses the university's schools of medicine, dentistry, and nursing. A college of pharmacy will be built later. The main auditorium, seating 600 people, is wired for television, and when the equipment is complete operations being performed in other parts of the building will be televised. Dr. Edward L. Turner is dean of the medical division.

SUCCESSFUL TREATMENT OF TWO CASES OF GANGRENOUS INTUSSUSCEPTION IN CHILDHOOD

BY

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Early surgical correction of an acute intestinal intussusception in childhood usually results in a satisfactory recovery, but when gangrene of the constricted bowel has occurred the mortality rate is very high. Only three recoveries were reported by Ladd and Gross (1941) in 18 cases in which a primary anastomosis was carried out to deal with this complication. A Mikulicz double enterostomy operation produced only seven recoveries in 25 cases. Similar experiences have been recorded by Nyborg (1943) and by Wakeley and Atkinson (1938).

The onset of an intussusception in childhood is usually marked by sharp bouts of severe abdominal colic, though sometimes this symptom may be difficult to recognize or quite indefinite. Vomiting on one or more occasions occurs in the first 24 hours. Anorexia is often pronounced, and some pyrexia is present in the majority of cases. The motions are often looser than usual, but in about 50% no blood is passed in the first 24 hours. Though the "red-currant jelly" stool is characteristic, only streaks of blood may be passed or the motions may merely appear dark from altered blood, and the condition should not be overlooked in such cases. The shocked state of the child between paroxysms of colic is also an important point, and it is easier to palpate the abdomen at this time. If an abdominal mass is present it is prominent during peristalsis, though tightening of the abdominal wall and screaming may interfere with examination. Rarely, constriction at the neck of the intussusception is not severe enough to interfere with the vascular supply of the invaginated gut or to cause much intestinal obstruction. In such a case the history is of recurrent bouts of peri-umbilical pain for days or weeks without vomiting or the passage of blood per rectum. In the following two cases absence of a typical clinical picture resulted in a serious delay in diagnosis and admission to hospital.

Case 1

A boy of 22 months was admitted because of vomiting, restlessness, and anorexia since a brief attack of diarrhoea five days before. One convulsion occurred the day before admission. He had been treated for gastro-enteritis with sulphaguanidine, as his mother had suffered from a bout of diarrhoea at the same time. There was now no abdominal colic and the stools were normal. On examination he was listless, hypotonic, and dehydrated, but the skin colour was good. He was distended and resented abdominal palpation, but no localized tenderness or mass was detected. The urine was normal and contained chlorides. Other systems were normal. His temperature was 98.4° F. (36.9° C.), pulse 140, and respirations 40. He was given an intravenous infusion of half-strength Hartmann's solution with 5% glucose. Twelve hours later he passed a tarry motion for the first time, and the distended abdomen then showed peristaltic waves. A barium enema confirmed the presence of an intussusception in the right half of the transverse colon.

Operation under general anaesthesia was performed by Mr. Gardham. On opening the abdomen by a right paramedian incision greatly distended intestine escaped from the wound. Complete reduction of the intussusception was not possible, and there remained a length of about 2 in. (5 cm.) of ileum situated some 6 in. (15 cm.) from the ileo-caecal valve in which there was an irreducible intussusception. Owing to the peritoneum splitting over a distended ileum, and in order to return the small intestine to the abdomen, a catheter was inserted into the ileum and the contents aspirated. The gangrenous intussusception was resected and a double-barrelled ileostomy was formed at the lower end of the incision.

During the operation and for 48 hours afterwards gastric suction was applied. For the first 12 hours it was used continuously, and then during alternate hours. For the first six post-operative days the child had half-strength Hartmann's solution with 5% glucose intravenously, each pint alternating with a pint of half-strength plasma. A watch was kept on the plasma chlorides, and when these were reduced normal saline was infused until the level was corrected. Before oral feeding was started the daily intravenous fluid intake was 3 oz. per lb. (180 ml. per kg.) body weight; later, as the quantities of food by mouth increased, the intravenous infusion was decreased. Twenty-four hours after operation he was given hourly 1-oz. (28-ml.) feeds of water during the day, and after 48 hours small feeds of 1½ oz. (42 ml.) of half-strength reconstituted dried milk three-hourly for six feeds in the day. By the sixth post-operative day he was taking 4-oz. (114-ml.) feeds thickened with a proprietary food five times in the day. He had a pyrexia of 101° F. (38.3° C.) for the first 10 days; penicillin, 50,000 units, was therefore given eight-hourly and a course of sulphadimidine for one week.

Four days after operation the abdomen was still distended. The ileostomy did not work well at first, becoming blocked intermittently. The abdominal wall round the ileostomy became very excoriated and was treated by splinting the child's arms to prevent him from scratching, exposing it to the sun, and applying polyvinyl alcohol jelly buffered to *p*H7. The jelly was warmed to make it more fluid, and was applied to the skin every two or three hours during the day and night; on cooling, it set as a thin impervious layer protecting the underlying skin.

A month after the original operation the ileostomy was separated from the parietes, the distal loop of ileum closed with catgut, and the proximal loop joined to the caecum by an end-to-side anastomosis. An intravenous infusion of half-strength Hartmann's solution with 5% glucose was again alternated with plasma intravenously for three days; from this time the child's recovery was uneventful, and he was discharged from hospital seven weeks after admission.

Case 2

A boy of 9 months was admitted because of drowsiness and vomiting of all feeds for 24 hours. He had developed a slight cough three days before, which was improving. He had anorexia, though usually his appetite was good. The last normal stool was passed just before the onset of the vomiting. At no time was there obvious colic and he did not scream or draw up his legs.

The child looked ill, shocked, and pale, but was well nourished and big for his age. There was no dehydration. The pulse rate was 180 a minute and the temperature 102° F. (38.9° C.). The abdomen was soft and easily palpated without tenderness or guarding. A small ill-defined swelling was present in the left hypochondrium, extending in the line of the proximal descending colon for 2 to 3 in. (5 to 7.5 cm.). Visible peristalsis was not found, and there was no abnormality on rectal examination. Other systems were normal. Fresh blood and mucus were passed per rectum for the first time an hour after admission. Intussusception was diagnosed, and an intravenous drip of half-strength normal saline and 5% glucose was set up preparatory to surgical treatment.

At operation under general anaesthesia Mr. Gardham found a little free fluid in the abdomen; the intestines were not distended. The head of the intussusception was felt in the splenic region. Reduction of the mass could be effected as far as the middle of the ascending colon. Beyond this point the

bowel was gangrenous, and resection of the proximal 3 in. (7.5 cm.) of ascending colon and caecum, the appendix, and the distal 2 in. (5 cm.) of the ileum was carried out. Thrombosed veins were present in part of the mesentery removed. The ileum and remaining parts of the ascending colon were double-barrelled; they were brought out through the lower end of the incision and clamped with Pringle's clamps, these being left attached and removed after 12 hours.

The post-operative condition of this child was fair. He was put on prophylactic penicillin, 30,000 units four-hourly, and sulphadimidine, 0.5 g. four-hourly. The ileostomy began to function on the third post-operative day. Intermittent gastric suction was continued for three days, and the intravenous infusion was kept up with half-strength Hartmann's solution containing 5% glucose alternated with half-strength plasma. Normal saline was substituted whenever the plasma chlorides were reduced. After 48 hours he started ½-oz. (14-ml.) feeds of expressed breast milk three-hourly, as he had previously been in process of being weaned. The size of oral feeds was rapidly increased, so that by the fourth post-operative day he was taking eight 1½-oz. (42-ml.) feeds daily.

On the fifth post-operative day the temperature rose and the ileostomy ceased to function, vomiting recurred, and gastric suction was restarted. Next day abdominal distension was apparent, the child looked ill, and an *x*-ray film of the abdomen showed multiple fluid levels in the small intestine. A high intestinal obstruction was diagnosed.

Operation under local 2% procaine was performed by Mr. Gardham, using the right-oblique-muscle-cut approach. Distended and congested bowel was found in the region of the duodeno-jejunal junction, caused by a band which had kinked the bowel and had obstructed it without interfering with the blood supply. The distended loop was aspirated with a catheter, and a purse-string suture closed the hole. Intermittent gastric suction was continued for 48 hours after the second operation; then the child was given small feeds of breast milk, with gastric suction for an hour before each feed for the next four days. Twelve days after the first operation the intravenous drip was taken down, and on the 13th day a large haematoma was evacuated from the muscle-splitting incision. The sutures were removed and the wound allowed to granulate from the bottom. The wound area was exposed to the sun, and polyvinyl alcohol buffered gel was used to prevent the intestinal juice from digesting the skin. We found on this occasion that the buffered jelly did not completely prevent excoriation, so resort was had to a thick coating of aluminium paste about the ileostomy.

By the 22nd post-operative day the child had gained 1½ lb. (0.68 kg.) in weight, but during the next 10 days 2½ lb. (1.13 kg.) was lost. The administration of 200 ml. of plasma by tube into the stomach showed satisfactory absorption. As there was no great amino-acid loss in the ileostomy faeces it was concluded that neither intestinal hurry nor lack of absorption of food was primarily responsible, but possibly there was a vitamin deficiency due to failure of synthesis in the isolated colon. When given aneurin, riboflavin, and nicotinamide in adult doses he began to put on weight again and his diet was supplemented by 20 g. of casein added to dried-milk feeds three times a day. On the 32nd day after operation an enterotome was applied; this was followed 18 days later by the passage of the first normal motion. After seven days an extraperitoneal closure of the ileocolostomy was carried out and the wound left open. The child now began to gain weight more rapidly, and he was discharged home on the 75th post-operative day.

Comment

Recent writers have expressed the need for both pre-operative and post-operative intravenous replacement therapy and gastric aspiration (Nyborg, 1943; Hindmarsh, Stewart, and Morrison, 1945; Morrison and Court, 1948). The type of fluid administered depends upon the state of shock and dehydration of the infant and upon the plasma chlorides. In the two cases reported plasma was given for shock and the nutritional state.

When the plasma chlorides were low, normal saline with 5% glucose was given until the chloride estimations were again satisfactory. If dehydration persisted, with normal plasma chlorides, half-strength Hartmann's solution with 5% glucose was given. An anaemia of 50% haemoglobin in one child was treated with whole-blood transfusion. Oral feeding was started 24 hours after operation, with 1 oz. (28 ml.) of water hourly, gradually increasing to 5 oz. (142 ml.) or more of breast milk or dried-milk feeds. Gastric aspiration with the Wangensteen apparatus was continued intermittently for 10 days.

Nyborg has recently recommended neostigmine to combat paralytic ileus, but we consider its use is not free from danger, and prefer nepenthe, intravenous fluid replacement, and gastric suction. Penicillin and sulphonamides should be given in prophylactic courses.

Of the recommended operative procedures, the Mikulicz double enterostomy operation seems to us to be safer than excision and primary suture, or oversewing and hoping the gangrenous part of the bowel will be passed spontaneously per rectum. The primary suture involves anastomosing an acute obstructed gut to a normal gut, while the latter does not relieve the obstruction at all. Oversewing, with a proximal ileostomy of the Witzel type, has been recommended, but in this type of operation the gangrenous infected segment is still left inside the abdomen.

The disadvantages of the Mikulicz procedure have been quoted as being wasting, excoriation of the abdominal wall, and further operative procedures for closure. The first disadvantage can be combated by giving vitamins and extra proteins, the second by polyvinyl alcohol gel or aluminium paste, and it has been noted how soon a well-formed stool comes from the ileostomy. Closure of the ileostomy starts with crushing the spur, with an enterotomy 10 days after the first operation, followed later by an extraperitoneal or intraperitoneal closure.

We believed that the surgical, biochemical, and feeding problems presented by cases such as the two described stand more chance of a successful solution when the surgeon and the paediatrician combine forces in the treatment of the child.

Summary

Two cases of gangrenous intussusception in childhood are described. Both were operated on and a Mikulicz procedure performed. With intravenous infusion and careful feeding both patients recovered.

We wish to thank Dr. B. E. Schlesinger and Mr. A. J. Gardham for their help and kind permission to publish this article.

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A cartoon film entitled "Local Government—a History in Pictures," sponsored by the Ministry of Health and produced by the Central Office of Information, traces the origin and historical development of one local authority—Norwich. Copies are available free of charge to borrowers with their own sound projector, and may be obtained from the Central Film Library, Imperial Institute, London, S.W.7. It can also be shown free by mobile units of the C.O.I. to special audiences. Application for this service should be made to the appropriate regional film officer, whose address can be obtained from the C.O.I., Norgeby House, 83, Baker Street, London, W.1.

Medical Memorandum

Subacute Bacterial Endocarditis Due to Salmonella typhi-murium

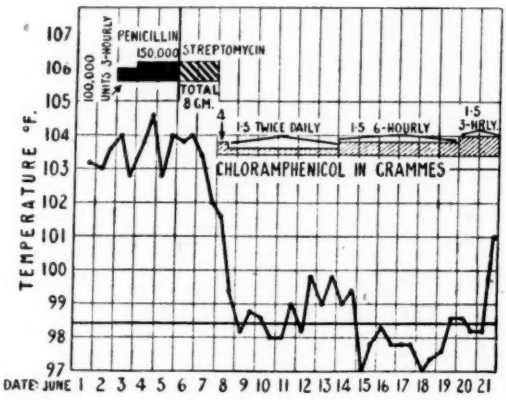
In view of the rarity of subacute bacterial endocarditis due to *Salmonella typhi-murium*, the following case may be considered worthy of publication.

Case Report

A single girl, aged 19, a bottler in a mineral-water factory, was admitted to hospital on June 1. There was no previous history of illness of any kind apart from some fits in infancy. The present illness had started seven weeks before with general weakness, occasional rigors, and epistaxis, and during the week preceding admission there had been unproductive cough and bouts of diarrhoea.

On examination there were marked pallor, furred tongue, sordes on the teeth, prostration, and mental depression; temperature 103° F. (39.4° C.), pulse 112, respirations 40; throat clear; pupils and fundi normal; no neck rigidity or Kernig's sign; abdominal reflexes absent, but all deep reflexes present. A few scattered rhonchi were heard in the lungs. Examination showed no enlargement of the heart clinically, but there was a marked gallop rhythm and a blowing apical systolic murmur not conducted into the axilla and not accompanied by a thrill. The abdomen was slightly distended and tumid on palpation, but the liver and spleen were not felt. B.P. 120/80. A chest radiograph on admission was clear. Her white cells numbered 13,800 (80% polymorphs) and red cells 4,510,000 per c.mm.; Hb 81%. Blood was sent for culture and agglutination, and specimens of stool and urine for culture.

Her condition remained serious and her temperature continued without intermission as in the accompanying Chart; penicillin, 100,000 units three-hourly, was started on June 3 and



increased next day to 150,000 units three-hourly without any effect. On June 3 it was reported that there were no agglutinations to *Salm. typhi* O, *Salm. typhi* H, *Salm. paratyphi B* O, *Salm. paratyphi B* H, non-specific *Salmonella* H, or *Brucella abortus*, but on June 6 *Salm. typhi-murium* had been cultured from the Widal clot. In the meantime petechiae had appeared on the upper arms and at the root of the neck, and her general condition had deteriorated still further. The diagnosis was now apparently septicaemia due to *Salm. typhi-murium* (? subacute bacterial endocarditis), and it was decided to try to obtain a supply of chloramphenicol ("chloromycetin") from Parke, Davis and Co. in view of the results obtained in other *Salmonella* infections. Pending the arrival of the drug (over the Whitsun holidays), and in view of the patient's desperate condition, streptomycin was given six-hourly in 1-g. doses. The chloramphenicol arrived after a total of 8 g. of streptomycin had been given, and by then the patient's general condition was decidedly better, with fewer fresh petechiae and improvement in the gallop rhythm, but no marked fall in temperature. Sensitivity of the organism was demonstrated to chloramphenicol and to a greater degree to streptomycin.

Chloramphenicol 4 g. (16 capsules of 0.25 g.) was given at 10 a.m. on June 8 and was continued in 1.5-g. doses twice daily; by 10 p.m. her temperature was normal. The next day the improvement in her toxaemia was quite marked, but she developed sudden pain and swelling in the right knee with severe limitation of movement. Fundus examination showed severe toxic changes in the right macular region, and a small subhyaloid haemorrhage in the left macular region. Her diarrhoea rapidly improved and was replaced by complete constipation; but fresh petechiae continued to appear, and in view of a slight rise in temperature on June 12 and 13 it was decided to double the dose of chloramphenicol by giving 1.5 g. six-hourly. From then on her temperature did not rise above normal until she died. She continued to be extremely irritable and prostrated, however, and fresh petechiae appeared, though fewer in number; the blood pressure fell progressively to 66/50; the apical systolic murmur changed suddenly to a high-pitched musical murmur, and in spite of increasing the dosage again to 1.5 g. three-hourly she developed acute pulmonary oedema and died on June 22. At no time were specific agglutinins demonstrated against this strain of *Salm. typhi-murium*, and all specimens of stools and urine were negative on culture for that organism throughout.

Post-mortem examination showed no abnormality in the nervous system or in the abdomen, and in particular there were no lesions in the intestines, but two small white infarcts were found in the spleen. The lungs were very oedematous and there were a few small subpleural infarcts. The heart was normal in size but extremely flabby, and the myocardium was very toxic in appearance and necrotic in parts. There were two vegetations on the mitral valve, one small and one moderate in size, and apparently still active but sterile on culture. Microscopy of the vegetations showed only polymorphs present in the fibrin, and no bacteria were seen.

Comment

Systemic invasion with *Salm. typhi-murium* appears to be comparatively rare. Seligmann and Hertz (1944) report a case of cholecystitis and two cases of salpingitis; Angrist and Mollov (1946) quote Seligmann's post-mortem findings of infected dissecting aneurysm of the aorta and a case of mitral endocarditis. In general, mortality appears very high when *Salmonella* infections become invasive, and the chief help from chemotherapy is likely to be the prevention of systemic invasion by early control of the primary infection. In the present case of established endocarditis the continuing occurrence of petechiae in spite of a normal temperature, and the sudden change in quality of the cardiac murmur at the end of 12 days' intensive treatment, suggest that a much higher maintenance dosage is required at the onset of treatment than is employed in typhoid (i.e., 1.5 g. of chloramphenicol three-hourly instead of twelve-hourly), and this would possibly have to be continued for at least 28 days, on the analogy of penicillin therapy for subacute bacterial endocarditis. Fortunately the drug appears to be completely non-toxic even in such large doses.

I would like to express my thanks to Dr. W. Kwantes, of the Public Health Laboratory, Carmarthen, for his assistance with the bacteriology of this case; to Dr. A. F. S. Sladden, Director of the Beck Laboratory, Swansea General Hospital, for the pathological examinations; to Dr. Stanley White, chief medical officer to Parke, Davis and Co., for his invaluable assistance in obtaining supplies of chloramphenicol; and to Dr. Joan Taylor, of the Salmonella Reference Laboratory, for her reports on the organism.

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Reviews

THE PASTORAL SIDE OF MEDICINE

Rational Medicine. By John W. Todd, M.D., M.R.C.P. (Pp. 378. £1 5s.) Bristol: John Wright and Sons. 1949.

Books entitled "Rational Medicine" so often proceed to deal in irrational medicine that one is relieved to find this sensible account of some aspects of diagnosis and treatment. It begins with a critique of the value and meaning of signs and symptoms, discusses later the effects of treatment by special regimens, diet, and drugs, and describes at some length the unfortunate section of the population, referred to by William James as the tender and by the laity as the highly strung, which provides the raw material for prophets of auto-intoxication, focal sepsis, sympathetic imbalance, sexual repression, or whatever may be the current explanation of sub-average health and vitality. Dr. Todd's sceptical views on rest, constipation, psycho-analysis, and the like are in touch with current thinking, and students who read this book will be better equipped to minister to sick people than might otherwise have been the case.

"Minister" is the key word, for Dr. Todd has written a book about what has been called the pastoral side of medicine. My experience is that students find formal instruction in these matters tedious, and they are more likely to acquire the necessary skill and attitude from the example of teachers who practise than from those who preach or write. Just as dynamic psychology can only be learned by the experience of analysis and similar procedures, so the vague concept of ideas which goes by the name of psychosomatic medicine cannot be learned by the student from books, but only by the experience of working with living people under the supervision of sympathetic teachers. But if they should want a text, they will find Todd more useful than Flanders Dunbar and her school, though less profound than Clark-Kennedy.

L. J. WITTS.

AN UNORTHODOX DOCTOR

Doctor Himself. An Unorthodox Biography of Harry Roberts, M.D. By Winifred Stamp. Introduction by V. S. Pritchett and sidelights by Sidney Dark, H. M. Tomlinson, Gerald Bullett, and Lord Horder. (Pp. 165. 10s. 6d.) London: Hamish Hamilton. 1949.

It is a long time since I read a book which kept me as interested, and indeed as excited, as this. I imagine that the author enjoyed writing it as much as I did reading it. In it a very unusual kind of man has found a biographer as unconventional as himself.

Dr. Roberts was one of three sons of a father who determined on an income of £300 a year to make all of them doctors. Harry showed his self-confidence at the age of 9 when he "wrote a book" on gardening, one of the ruling passions of his life, which purported to be "written for the use of schoolmasters and others." Not particularly notable as a scholar, he did once get a prize for an essay on "Thrift," which, the author slyly remarks, "seems to have satisfied him on this subject for the rest of his life." It is impossible in this review to record the incredible number of channels into which Roberts directed his energies. He left his medical studies at St. Mary's unfinished to become a science master at Leek, in Staffordshire, where, after marrying, he made the place too hot for him by his socialistic activities. He defied every social convention and was dismissed.

It was during this phase that he formed friendships with many of the leading socialists of the time. Some of his local friends, loath to lose him, offered to set him up in a public house. Probably Roberts would have agreed, but his wife jibbed. After a short and inglorious career on the stage he went back to St. Mary's, eking out the scanty allowance from his father by "cramming" for a correspondence college, where he became friendly with H. G. Wells. After qualifying and doing a few locums he went into general practice in Cornwall, where he did much miscellaneous authorship, always on country subjects, for he was above everything a countryman. The literary contacts he made here eventually brought him to London, where he combined journalism with general practice as a side line. There was a curious episode at this time when (though Sidney Dark, a lifelong friend, remarks that Roberts was a "born heretic") he toyed with the notion of becoming a priest in the Established Church. He went so far as to make contact with Bishop Winnington Ingram, who was prepared to accept him. But both the Bishop and Roberts realized in time that the Church was no place for a "born heretic." There followed some years of journalism, and it was not until 1904 that he found his real place in medical practice.

The story of how and why he went to Stepney is fantastic and is told with great humour and understanding. He built up there, in the most unpromising conditions, what became the largest panel practice in the country—and not only the largest but the most unconventional. In it were employed four partners, a dentist, a masseur, and two nurse-midwives. Roberts personally attended over 500 confinements in his first year. This would have more than satisfied most men, but Roberts had many other irons in the fire. For many years he wrote a "medical column" which was syndicated by a group of newspapers. He even started a weekly paper *Topics*, which had a disastrous career of three weeks.

Making money did not interest Roberts, except as a means of financing his schemes for practical social reform. He quickly became the best-known public man in the East End, largely through his work on the Stepney Board of Guardians. He was pressed to become the Labour candidate for the Division. His prospects of election seemed very promising, but, though he always regarded himself as a socialist, the book shows that he was at heart a thorough individualist and no good party man. After many quarrels with the local party he resigned his candidature, refusing to be bound by any party pledges. At one time he had written a book on *Constructive Conservatism* which brought him into contact with many of the younger Tories.

No picture of the man would be fair to him if it did not mention the way in which he discovered the small estate near Petersfield out of which he created a home and a garden. Here, in the intervals between his strenuous work in Stepney, he undoubtedly spent the happiest days of his life. It was no "week-end cottage." He and his faithful secretary, the author of this book, worked incredibly hard to make it not only a notable garden but a guest house (populated largely by "cranks"), and at one time a sanatorium for tuberculous children. The author rightly describes the inmates as "happy-go-lucky." Many notable people visited the place, where they found a congenial host. Roberts was inevitably drawn into the social and cultural life of Petersfield.

The fascination of this man is brought out in tributes by V. S. Pritchett, Sidney Dark, H. M. Tomlinson, Gerald Bullett, and Lord Horder. The last named knew Roberts personally only during the last five years of his life, but

the impression made by him is well brought out in the closing sentences of his tribute : " Havelock Ellis has said that the art of life is really the art of loving, but that we only master this art too late. It is with gratitude to Fate and with humility that I can say that in the case of Harry Roberts and myself we were just in time."

With confidence I strongly recommend this book to anyone who likes to read about a vivid personality made known by a writer who is obviously the one person who could do it.

ALFRED COX.

MALNUTRITION IN GERMANY

Das Hungerödem und andere alimentäre Mangelerkrankungen. By Professor Hans W. Bansi. (Pp. 211. No price.) Stuttgart: Ferdinand Enke. 1949.

Professor Bansi is the senior physician of the first medical division of St. George's Hospital, Hamburg, and has based his book on hunger oedema on his experiences of malnutrition during the British occupation between 1945 and 1948. The approach is mainly clinical, though there is a considerable amount of chemical and clinical pathology in the book. The author discusses the history of the condition and describes the effect of hunger oedema on the various organs of the body, on the haemopoietic system, and on the blood chemistry. There follows an account of the cause of the disease and its pathology, pathogenesis, differential diagnosis, prognosis, and treatment. The author also discusses what he calls *Mangelfettsucht* or paradoxical *Fettsucht*, an excessive fatness seen in some young women and repatriated prisoners of war which he considers was due to an endocrine dysfunction.

There is an index, though not a very detailed one, a bibliography of some five hundred references, and twelve photographs of patients suffering from hunger oedema. The book is illustrated with numerous tables and diagrams, including an interesting representation of the energy liberated by the combustion of a pound of fat in the body. This apparently provides enough energy to play 77 hours of light music but only 30 hours of Beethoven. Considering that the author's observations were made during the difficult post-war years in Germany, the number of laboratory investigations performed was remarkable. These include studies on nitrogen and calcium balance, water and creatin excretion, glucose-tolerance tests, and complete haematological investigations. Although it is difficult to contribute anything really new on the subject of malnutrition to-day, Professor Bansi has tackled the subject with Teutonic thoroughness.

F. PRESCOTT.

THE SURGEON AND THE SPASTIC CASE

Cirugía de las parálisis espásticas. By F. Bastos Mora. Preface by M. Bastos Ansart. (Pp. 151 ; 52 illustrations and 22 drawings. 65 cents.) Barcelona: José Janés, Publicaciones Médicas.

This account of the surgery of spastic paralysis is a successful effort to synthesize in manual form a clinical entity and a surgical problem which has taken many of us, and undoubtedly will take many others, long and painful hours to study. It is a small monograph by a collaborator of M. Bastos Ansart, on whose experience the text is mainly based.

In spite of its reduced number of pages this work includes the major features of interest in the subject, and emphasis is correctly placed on the physio-pathological factors involved. The works of Förster, Pollok, Fulton, Stoffel, and Barré are those which the author mainly follows in his study of the two principal factors contributing to the clinical picture of these patients—paresis and spasticity. The description of the part played by the sympathetic nervous system in muscular tonus is mainly based on the results of histological findings to which the Spanish school has greatly contributed, particularly Castro, Cajal, Del Rio, and Tello. A good account is given of the major signs and symptoms which form the clinical picture of the spastic case, and comment is made on the intellectual and language changes so frequently associated with this central disturbance.

The first part of the book ends with separate descriptions of the main characteristics of paralysis in the upper and lower extremities. The second part discusses the values of a number of surgical techniques which have been employed in the treatment of the condition. It is this section that is most fully based on the author's own experience. He mentions the part which may be played by efferent neurectomy (Stöffel) before excessive shortening has taken place in muscular contractures localized to one muscular group only, but he is rightly moderate in his enthusiasm for this method. Tenotomy, tendon elongation, muscular transplant, and muscular reinsertion are in general well valued, and the book ends by mentioning the most important features of surgical treatment applied to different parts of the limbs. Illustrations emphasize a number of the author's points, and a well-selected, if reduced, bibliography completes the work.

J. TRUETA.

HANDBOOK OF TROPICAL MEDICINE

An Epitome of the Laboratory Diagnosis and Treatment of Tropical Diseases. By Horace M. Shelley, M.R.C.P., D.T.M.&H. Second edition. (Pp. 147. 10s. 6d.) London: Staples Press.

There are several good textbooks on tropical medicine and more than one good synopsis, but the author of this useful brief work has confined himself to two important aspects of the subject—laboratory diagnosis and treatment. The book will not be particularly helpful to the student of tropical medicine for examination purposes, but it will be useful for quick reference by the general physician in this country, who is being made increasingly conscious of tropical infections by the many examples that he is encountering in ex-Servicemen in his practice.

The only general criticism is that the author has some weakness for sitting on fences ; he too frequently uses such expressions as " may be examined " and " should be tried."

The treatment of malaria is not satisfactory : the author never faces the real problem of this disease, which is the treatment of the benign tertian infection to prevent relapses. That the complete answer has not yet been found is no excuse. The position of pamaquine in the treatment of malaria is nowhere clearly defined. Methylene blue is described as a remedy for malaria without any qualifications, and chloroquine and pentaquine are not mentioned in this chapter. The section on kala-azar is fairly satisfactory, though it is stated that solidification is the indication of a positive serum formalin reaction: the criterion is opacity, not solidification. There is no reference to the troublesome neuropathy that may follow treatment by stilbamidine, though this drug is recommended. These are not serious defects, however, and to some extent are the result of compression, with which the author has on the whole been very successful. The format is excellent and the price reasonable, but the book is not entirely free from misprints.

L. EVERARD NAPIER.

CARE OF THE TUBERCULOUS PATIENT

Tuberculosis Nursing. By Jessie G. Eyre, S.R.N. (Pp. 304; 102 illustrations. £1 1s.) London: H. K. Lewis and Co. 1949.

The author of any book on the nursing of a condition such as tuberculosis has always a difficult task in deciding how much to include and how much to leave out. Tuberculosis covers a very wide field, and a successful tuberculosis nurse must have knowledge of many subjects beyond that of attention to the patient. In the volume under review the author has carefully balanced the information on these ancillary matters with those of the actual nursing and treatment of the patient, and has thereby succeeded in producing a guide both for those who wish to undertake tuberculosis nursing as a means of gaining additional post-graduate experience and those who intend to specialize in the subject. She has also shown very clearly that tuberculosis is full of interest to the nurse, and that special training is necessary if the nursing problems are to be overcome and the patient is to receive full benefit from the treatment. The book demonstrates the important role of the nurse in the management of the case: without the co-operation of a well-trained nurse the physician can have little hope of providing his patients with efficient and beneficial treatment.

The chapters on nursing procedure are particularly good, and a useful appendix to the book contains valuable information on disinfectants, preparation of surgical equipment, and the examination of sputum. A little more care might have been exercised in the arrangement of the chapters on clinical matters, in that there is a tendency to group a number of not too closely related subjects under a caption that is really limited to a definite aspect of the disease. This may be noted in the chapters on the course and clinical picture of pulmonary tuberculosis. If future editions are published, it is hoped that information will be included on such matters as the various types of apparatus used in artificial pneumothorax treatment, epituberculosis, tuberculosis of the eye, the use of streptomycin in the treatment of tuberculous laryngitis, the jelly patch test, and the vole acid-fast bacillus vaccine. In the chapters on tuberculosis care and aftercare the functions of the regional hospital boards will have to be clarified from those of the local health authorities.

FREDERICK HEAF.

The first edition of *Pathology of the Nervous System*, by J. Henry Biggart, M.D. (foreword by Professor A. Murray Drennan; pp. 352; £1 1s.; Edinburgh: E. and S. Livingstone, 1949), published in 1936, justly enjoyed a popularity which led to its reprinting in 1940. In this second edition the general form has been maintained. It is only 17 pages longer in spite of the addition of certain sections and the rewriting of parts of the text to bring it up to date. Sections on polyarteritis nodosa and fat embolism have been added to the chapter on vascular diseases, and aneurysms of the carotid artery within the cavernous sinus now receive a note. Articles on toxoplasmosis, Boeck's sarcoidosis, acute lymphocytic chorio-meningitis, and equine encephalitis are useful additions to subsequent chapters, while the accounts of tuberculous meningitis and anterior poliomyelitis have been revised. Knowledge acquired during the war upon the effects sustained by the brain in head injuries has led to extensive revision of the appropriate chapter. Many new illustrations in half-tone appear, and a notable addition is the inclusion of ten excellent colour plates made from photomicrographs by Mr. T. Dodds, of Edinburgh University.

Specs, by "BM/TFCE" (pp. 49; 3s. 6d.; St. Albans: Cartmel; 1949) is a racily written survey which contains chapters on the National Ophthalmic Service, spectacle frames, and some elementary and not altogether accurate information on diseases of the eye.

BOOKS RECEIVED

[Review is not precluded by notice here of books recently received]

A Twentieth Century Physician. By the late Sir Arthur Hurst. Foreword by J. A. Ryle, M.D., F.R.C.P. (Pp. 200. 15s.) London: Edward Arnold. 1949.

Operative Surgery. By F. C. Hill, B.A., M.S., M.D. (Pp. 698. 63s.) Oxford University Press. 1949.

Is Evolution a Myth? By D. Dewar, B.A., F.Z.S., L. Merson Davies, D.Sc., F.G.S., and J. B. S. Haldane, F.R.S. (Pp. 92. 2s. 6d.) London: Watts and Paternoster Press (jointly). 1949.

Doctors East Doctors West. By E. Hume, M.D. (Pp. 278. 12s. 6d.) London: George Allen and Unwin 1949.

Recent Advances in Physiology. By W. H Newton, M.D., M.Sc. 7th ed. (Pp. 268. 21s.) London: Churchill. 1949.

Brompton Hospital Reports. Vol. 17, 1948. (Pp. 183. 10s.) London: Research Department of Brompton Hospital. 1949.

The Thyroid Hormones and their Action. By G. Mansfeld, M.D. Translated by E. Pulay, M.D. (Pp. 157. 24s.) London: Frederick Muller. 1949.

Operative Obstetrics. By J. M. Munro Kerr, F.R.C.O.G., M.D., and J. Chassar Moir, M.D., F.R.C.O.G. 5th ed. (Pp. 948. 63s.) London: Baillière, Tindall and Cox. 1949.

Society and its Criminals. By P. Reiwald. Translated and edited by T. E. James. (Pp. 315. 21s.) London: William Heinemann (Medical Books). 1949.

Ankylosing Spondylitis. Part 1 by F. Hernaman-Johnson, M.D., D.M.R.E., and Part 2 by W. A. Law, O.B.E., F.R.C.S. (Pp. 200. 25s.) London: Butterworth. 1949.

Fundamentals of Otolaryngology. By L. R. Boies, M.D. (Pp. 443. 32s. 6d.) Philadelphia and London: Saunders. 1949.

The Pharmacology and Toxicology of Uranium Compounds. Edited by C. Voegtlin, Ph.D., and H. C. Hodge, Ph.D. (Two vols. Pp. 1,084. 60s.) New York, Toronto, and London: McGraw-Hill. 1949.

Female Sex Endocrinology. By C. H. Birnberg, M.D. (Pp. 128. 35s.) Philadelphia, London, and Montreal: Lippincott. 1949.

Le Diagnostic Bio-clinique en Radiologie Pulmonaire. By G. Voluter. (Pp. 452. 40 Swiss francs.) Basle and New York: Karger. 1949.

Contribución del Coeficiente Citológico a la Fisiologia y Patalogia de la Correlación Hipofisotiroidea. By E. Del Conte. (Pp. 87. No price.) Buenos Aires: Libreria y Editorial el Ateneo. 1949.

Die Heilkunde und der Ärztliche Beruf. By P. Diepgen, M.D. 3rd ed. (Pp. 304. M. 18.) Berlin: Urban and Schwarzenberg. 1949.

Das Chronische Cystische Hydrom der Dura in seinen Beziehungen zum Sog. Chronischen Traumatischen Subduralen Hämatom und zur Pachymeningitis Hämorrhagica Interna im Lichte der Relationspathologie. By A. Bannwarth. (Pp. 57. M. 9.60.) Stuttgart: Georg Thieme. 1949.

Aktuelle Probleme der Pathologie und Therapie. By H. Holthusen. (Pp. 248. M. 29.) Stuttgart: Georg Thieme. 1949.

Grundlagen der Funktionellen Urologischen Röntgendiagnostik. By W. Pfeifer. (Pp. 88. M. 9.60.) Stuttgart: Georg Thieme. 1949.

Studie zur Psychopathologie Krampfbehandelter Psychosen. By H. J. Weitbrecht. (Pp. 86. M. 8.70.) Stuttgart: Georg Thieme. 1949.

Die Dystrophie. By H. Berning. (Pp. 197. M. 18.) Stuttgart: Georg Thieme. 1949.

Anatomie und Physiologie. By J. Bücker. 6th ed. (Pp. 152. M. 15.5.) Stuttgart: Georg Thieme. 1949.

Vom Wesen der Neurose. By E. Speer. 2nd ed. (Pp. 106. M. 7.80.) Stuttgart: Georg Thieme. 1949.

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HORMONES AND RHEUMATISM

In commenting on the dramatic results obtained by Hench, Kendall, Slocomb, and Polley in the treatment of rheumatoid arthritis by cortisone we referred[1] to the highly interesting series of experiments by Hans Selye and his colleagues from which they concluded five years ago[2] "that the adrenal cortex may play an important role in the pathogenesis of rheumatic and rheumatoid conditions in man." As a result of his observations Selye put forward the idea of "a general adaptation syndrome" and of "adaptation diseases." In the opening pages of this week's *Journal* Selye reviews some aspects of his work, and makes an important new contribution to the problems underlying the treatment of rheumatism with the adrenocorticotropic hormone (ACTH) and the "gluco-corticoid" hormone of the adrenal known as cortisone. He has succeeded in devising a method of producing an acute or chronic arthritis and periarthritis by the injection of formaldehyde into the tissues near a joint. Before the use of this technique experimental work on animals was held up by the fact that neither desoxycorticosterone (DCA) nor the lyophilized anterior pituitary preparation (LAP) which Selye employed produced arthritis regularly enough to permit the systematic investigation of therapeutic methods. With this difficulty overcome Selye has been able to study the influence of the pituitary-adrenocortical system on the production and prevention of experimental arthritis.

In his first series of observations a number of rats were given injections of DCA for fourteen days, after which a "formalin arthritis" was induced. In these rats and in the controls the immediate hyperaemic and oedematous response to the injection of formaldehyde was approximately the same. After a few days, however, the reaction tended to subside in the untreated control rats but not in the DCA-treated rats. The effect of cortisone and DCA, both separately and in combination, was then studied, and it was found that the joint swelling was very mild in the groups of rats receiving cortisone or cortisone and DCA, while it was pronounced in the remaining two groups which had received either DCA alone or no hormone treatment at all. From these and other similar experiments it became obvious that in both the acute and chronic phases of experimental arthritis cortisone inhibited, while DCA tended to exacerbate, the inflammatory process. In later experiments Selye found that if an injection of formaldehyde was preceded by one of ACTH the usual inflammatory reactions did not appear; while LAP, which will sometimes of itself produce an arthritic condition, seemed to increase the arthritis-producing effect of the formaldehyde. Certain other effects of cortisone and ACTH, among which may be mentioned involution of the thymus gland and other lymphatic organs, seemed also to be reversed as the result of sensitization by DCA and LAP.

One of Selye's previous findings had been that during the "alarm reaction" effects similar to those of cortisone are produced by any agent capable of causing systemic stress. In his present paper he shows that an experimentally produced alarm reaction inhibited the development of "formalin arthritis." This effect, he believes, is due to the endogenous secretion of ACTH and so of gluco-corticoids. This failure of animals subjected to severe stress to respond to the formaldehyde injections might be ascribed to their debilitated condition, but that this is not so can be judged by the fact that animals which showed no sign of weakness also failed to respond, while immediate and severe reactions to formaldehyde injections were observed in a series of adrenalectomized animals subjected to stresses which rendered them almost moribund.

It would seem therefore, if these experiments are confirmed, that the inhibition of "formalin arthritis," and probably other types as well, by cortisone, ACTH, and the alarm reaction is due to the direct effect of gluco-corticoids upon the injured tissues. The mechanism of this response is unknown, but it might be related to the well-known antihistamine action of the gluco-corticoids. It has long been assumed that histamine-like compounds are liberated from tissues at the site of injury and are concerned in the development of inflammation. Further investigation of the action of antihistamine drugs in some of the other clinical conditions which seem to be benefited by cortisone or ACTH might have interesting results.

The apparent antagonism between these two hormones and DCA and LAP is difficult to explain, particularly since the degree of adrenocortical enlargement produced in experimental animals by both series of hormones was almost exactly the same. Selye himself suggests that

[1] *British Medical Journal*, 1949, **1**, 812.
[2] *J. Amer. med. Ass.*, 1944, **124**, 201.
[3] *New Engl. J. Med.*, 1949, **241**, 529.

DCA, being a close chemical relative of cortisone, might prevent the latter from reaching its target organs. Possibly some competition mechanism is involved, similar to that between vitamins and their corresponding anti-vitamins.

It is evident from Selye's work and from other published reports that the anti-arthritic effect of cortisone and ACTH is to a large extent non-specific. Recently Thorn and his associates[3] have shown that ACTH has a curative action in gouty arthritis, and they have observed that an acute attack often occurs when treatment is discontinued. Selye has found too that when the onset of "formalin arthritis" has been inhibited by an alarm stimulus the condition may flare up in a particularly severe form after a period of latency. Such observations are bound to raise the question whether arthritis can be held in check indefinitely by continued treatment with cortisone or ACTH.

TUBERCULOSIS AND WAR

Twice within a period of 40 years whole populations have been forced to live in conditions of abnormal stress, and on both occasions the rise in tuberculosis mortality and morbidity rates was directly related to the devastation caused by the conflict. In spite of the disruption of national life many important epidemiological investigations have been carried out, and in the Milroy Lectures, published in this and last week's *Journal*, Dr. Marc Daniels has most ably summed up the history of tuberculosis in Europe during and after the war of 1939–45. He prefaces his study of tuberculosis mortality and morbidity with the remark that "when one presents statistics of tuberculosis in Europe it is with a feeling that they are better than no information at all, but not much better." This reservation is important, particularly as it applies to morbidity figures, for in occupied countries those diagnosed as tuberculous were able to obtain extra rations and privileges. It is known that some persons employed such devices as pressing small pieces of cotton-wool soaked in "lipiodol" on to their chests immediately before being radiographed, or chewing a small pellet of bread soaked in B.C.G. vaccine just before a specimen of sputum was taken.

Mortality figures cannot be influenced by such deceptions, but when large movements of population are taking place the influence of environmental factors is hard to assess. The experience of the island of Jersey provided some information about the effect of removing from a country large numbers of persons whose racial susceptibility to tuberculosis differed from those who remained. The population of Jersey before the recent war was composed mainly of English immigrants and Jersey natives. The former came, generally speaking, from a stock that has a fairly high racial resistance to tuberculosis, while the latter were of Breton extraction and had a lower resistance to the disease. When the war started large numbers of the English left the island, and after the German invasion most of the remainder, along with many of the healthiest of the Jerseymen, were removed to labour camps on the Continent. Dr. R. N. McKinstry, medical officer of health for Jersey, has shown in his annual report for 1947 that one of the immediate effects was a very steep rise in the mortality from tuberculosis. The high rate continued until 1945, when it suddenly fell. The rise after the outbreak of hostilities and the fall at their conclusion occurred too quickly to be related to changes in living conditions. A possible explanation for the rise might be that mainly susceptible individuals were left behind; the fall could have been due to the dilution of the susceptibles by the return of the resistant English residents at the end of the war. Some development of this theory might be possible by studying what effects the mass movement of Jews in Europe has had on mortality rates, since there is evidence that the Jewish race is more resistant to tuberculosis than other races. Something more than dilution, however, is required to explain the rapid fall in tuberculosis death rates that is taking place in Europe to-day, for only a small proportion of the displaced Jews have returned to their original homes.

Dr. Daniels refers to the need for further epidemiological studies. In spite of the mass of information available many of the wartime and post-war trends in tuberculosis cannot be satisfactorily explained. It remains an open question whether the many thousands of deaths from tuberculosis which would not have occurred but for the war were due in the main to new infections or to the aggravation of disease from which the patients would ordinarily have recovered. Except in Scotland the wartime rise in tuberculosis has chiefly affected men; in fact, in some countries the rise was confined to them. Many reasons have been put forward for this; it has even been suggested that men react more severely to malnutrition than women. Another phenomenon common to most countries is that as the mortality among males has fallen, so the peak of the curve has shifted towards the older age groups; the curve of the mortality rate for women, however, has retained a sharp peak at ages 15–24. An attempt to explain this has been made by studying the tuberculosis mortality in successive generations, and it appears that the curve of the tuberculosis mortality in different age groups plotted on a generation basis shows little tendency to change through successive decades.

Perhaps the most important anti-tuberculosis measure now in use which was not available after the first world war is mass vaccination with B.C.G. It may be that the vaccination campaign during the past 10 or 15 years has been largely responsible for the downward trend of the tuberculosis mortality rates in the Scandinavian countries. But B.C.G. vaccination will not account for the sudden fall in the figures for Holland, and for Amsterdam in particular. The extreme hardships suffered by the Dutch during the last years of the war would cause the death of many patients with active disease; the consequence would be a diminution in the foci of infection (the influenza epidemic of 1918–19 removed sources of infection in the same way). This, and a rapid improvement in diet at the end of the war and the restoration to their previous high standard of the preventive tuberculosis services, are having the desired result. There was no rise during the war in the tuberculosis mortality rate in Denmark, which, as Daniels points out, enjoyed a comparatively good standard of living. In fact Professor Knud Faber has stated that there was little or no fall in the protein and fat intake during the German occupation. In addition to this the public health services suffered little disorganization during the war and remained at their peacetime level of efficiency. In both Holland and Denmark there are three to four tuberculosis beds for each death from the disease, and therefore the segregation of infectious cases is relatively easy.

In many European countries, such as Poland, Italy, and Yugoslavia, great efforts have been made to increase the number of institutional beds. Though such beds are officially designated for treatment, the community benefits greatly by the segregation of the infectious cases. The standard of nursing in some countries is low compared with that in Britain, and one nurse may be put in charge of many patients. This at least has the advantage of overcoming the shortage of nurses, and even if the supervision of treatment has to be neglected the removal of each infectious patient from his or her home does limit the spread of infection. The use of residential nurseries and open-air schools, which in this country have a comparable value to the "preventorium," for breaking the contact between the child and the infectious adult is a development that began during the war period and should be encouraged.

In the rehabilitation of the tuberculous Great Britain leads the way. There is a great need for the spread of information about suitable methods in those European countries where no schemes are in existence. Perhaps some of the travelling fellowships recommended by the World Health Organization could be used to further the study of this important aspect of tuberculosis. At Papworth and Preston Hall and in the developing "Remploy" factories there are unrivalled opportunities for observing and investigating methods of training and rehabilitating tuberculous persons.

Dr. Daniels's study demonstrates very clearly how great an asset to any country is an efficient and well-equipped tuberculosis service. In countries with a service which before the war worked hard to prevent disease, recovery from the effects of war was more rapid than in the countries which possessed only a poor or inefficient service. The tuberculosis dispensary is still the nucleus of the service, and the development of this unit is an essential feature in all reconstructive programmes. It is noteworthy that in many countries the doctor in charge of the dispensary is regarded primarily as a tuberculosis specialist, and that in France "a tuberculosis specialist," aided by a specialist social worker, is appointed to supervise all tuberculosis work in the department. Thus there seems to be no doubt about the retention of tuberculosis as a specialty and about the need for a unified service to combat the disease. The survey made by Daniels of tuberculosis schemes in Europe affords an opportunity of looking at our own with a critical eye. In the regular examination of certain groups of the population, such as students, "we are falling far behind" several countries. There seems to be little doubt that successive annual re-examination of a community is a profitable undertaking that amply rewards the labour expended. It follows that the diagnostic and preventive services must be developed so that susceptible persons are prevented from contracting the disease, and so that appropriate treatment can be offered to infected persons when the disease is in its early and curable stage. In France the improvement in the tuberculosis services is reflected in the falling death rate; this has been greater in France than in any other country in Europe. Some of this decrease may be due to the extensive use of B.C.G. during recent years, and if this is so then due credit must be given to the pioneer work that has been done in France with this.

Dr. Daniels refers to the remarkable "sense of international duty" awakened by the war. No doubt the work of the World Health Organization, including the special assistance given by the Scandinavian countries to Unicef, has had a marked effect in reducing both the incidence and the mortality of tuberculosis in devastated countries. But there is no justification for complacency because the influence of war is receding and death rates are falling. Rather the time is opportune for even more strenuous efforts. The closing words of Daniels's second lecture are worth repeating: "Given respite from mutual massacre, there is no reason why this disease which has plagued the Continent of Europe for many hundreds of years should not be almost eradicated before the century is out."

SIZE AND ACTIVITY

The importance of scale and dimensions has been more seriously considered in relation to animal design than as affecting physical performance. It has been pointed out, for example, that a mouse which had been enlarged to the size of an elephant would be unable to stand, and that an elephant which had been contracted to the size of a mouse would be handicapped in agility by an unnecessary thickness of leg: in short that the sudden alterations in size which befell Alice in Wonderland would have raised problems of an engineering kind which her mathematician creator had failed to foresee. It has been left to Professor A. V. Hill, in a recent lecture to the Royal Institution,[1] to apply arguments of the same kind to questions of athletic performance, and to show that only in the high jump and in under-water swimming does size as such offer any advantage. The underlying geometry is simple enough: that in a scale enlargement a doubling of linear dimensions is accompanied by a fourfold increase in corresponding areas, and by an eightfold increase in volume, and incidentally in weight, provided that structural materials have been kept the same. In practice so simple an expansion is impossible, whether in engineering design or in animal anatomy, and for the nearest approach it is necessary to go to the sea, where the problem of standing up is no longer significant.

Between the blue whale, the largest of the Cetacea, and the dolphin, there is a range in length of about 12 to 1, and a range in weight of more than 1,000 to 1, though in general shape and design there is a reasonably close correspondence. Both animals move in the water with unusual efficiency, cruising for long periods at 15 knots, and being capable of shorter bursts of 20 knots or over. But on the basis of weight of muscle it has been commonly argued that the whale should have the easier task.[2 3] Parry, it is true, has pointed out that muscle power cannot be expressed as a simple function of size.[4] but Hill makes the broader physiological approach and examines the scale relationship between dolphins and whales in terms of the circulation of the blood—the factor which imposes an overall limit on rate of energy output. In one such investigation he examined the aorta of the whale, and showed that its cross-section or area was in approximately scale relationship to that of man, and presumably the dolphin. At the same rate of blood flow the aorta could therefore supply a quantity of blood in proportion to surface area, not to volume or weight. To achieve the latter proportion there would have to be a 10-times faster flow and a peak difference of pressure of the order of several atmospheres. This would obviously be impossible, and the same conclusion is supported by a comparison of heart size and heart rate. As between whale and dolphin, heart size is in proportion to weight, but heart rate should be reduced by a factor of about 8, so that it must be impossible for the larger whale to generate a horse-power in proportion to its weight. This accepted, it follows that whales as well as dolphins must possess a great capacity for inducing a smooth flow of water past their bodies, and that the performance of both should make ship designers envious.

More generally, it appears that in "similar" animals of whatever kind rate of energy output—otherwise horse-power—must be in approximate proportion to surface area, and that the development of engineering power in proportion to weight is an impossible achievement if respiratory and circulatory systems increase to scale. Other and converging arguments can also be adduced. In the case of swimming, the pressure on propulsive organs would be increased beyond possibility if they were moved at the same frequency in a larger animal as in a smaller one. In the case of running, the kinetic energy put into limb movement can only be balanced by the work done by muscles on the condition that frequency of movement is reduced in proportion as limb size is increased. The larger animal will have a slower heart beat, move its limbs more slowly, but achieve the same speed, other things being equal. Because of scale complications there is no such satisfying comparison as that between dolphin and whale. The elephant, at around 20 m.p.h., is clearly handicapped by the consequences in design of its greater size. The mouse, running flat out to safety, eludes stop-watch as well as stick. But the broad picture suggests a lesser variation in speed than might otherwise be expected. The larger greyhound is but slightly faster than the smaller whippet. The speed of the hunting leopard, which is credited with 64–66 m.p.h. in a short chase and is the fastest of all animals, is not so greatly different from the 24 m.p.h. achieved by man on his two legs. At various kinds of jumping there are closer correspondences. In a running jump the horse, large kangaroo, man, and the antelope can cover 25 to 30 ft. (7.6 to 9.1 m.) in that order, with the jumping hare only 5 ft. (1.5 m.) less. With a standing start the 4-in. (10-cm.) jumping mouse is the equal of man. Among high-jump "records" a rat kangaroo the size of a rabbit has been seen to clear an 8-ft. (2.4-m.) fence; the large kangaroo, helped by its higher centre of gravity, one of 9 ft. (2.7 m.).

There is at least general support in these figures for Hill's conclusion that, irrespective of size, animals of similar form and designed with a similar factor of safety should be able to run and swim at the same speed and to jump the same height. Muscle speed, adjusted to safety as well as function, shows a wider range, and for

[1] *Science To-day*, 1949, **6**, 341; *Nature, Lond.*, 1949, **164**, 820.
[2] Gray, J., *J. exp. Biol.*, 1936, **13**, 192.
[3] *Nature, Lond.*, 1948, **161**, 199.
[4] Parry, D. A., loid., 1948, **161**, 200.

this an engineering explanation can be suggested. As with an engine, reversals of movement which were over-rapid in proportion to size would break either muscles or structural components, and the kangaroo endowed with the muscles of a grasshopper would soon suffer injury. Muscle speed is adjusted to speed of living, and speed of living depends on heart rate and so on size.

SURGERY IN PULMONARY TUBERCULOSIS

The importance of surgery in the treatment of pulmonary tuberculosis is taken for granted, but 30 years ago the help of the surgeon was not even contemplated. The co-operation between chest physician and surgeon is now as close as in any branch of medicine, and the patient has greatly benefited in consequence. Two eminent authorities, H. Morriston Davies[1] and Th. Naegeli,[2] who have been pioneers in applying surgery to the treatment of pulmonary tuberculosis, have recently discussed developments in this field, and in general their views do not diverge very far.

If an artificial pneumothorax is inefficient or contra-selective the result is bad, and when there is tracheo-bronchial tuberculosis or a persistent surface or tension cavity this form of treatment may be dangerous. In such cases, however, pneumothoraces are often maintained. These contraindications are not emphasized by Naegeli. Division of adhesions is necessary in order to maintain an artificial pneumothorax in many cases, and although this will usually be done by the cautery through a thoracoscope an open operation is occasionally required. There should be no hesitation in abandoning an ineffective artificial pneumothorax in favour of a major surgical operation. Both Morriston Davies and Naegeli recommend oleothorax for a small group of patients—in fact they would use it more often than is customary in this country. They agree that the place for phrenic crush is limited and that it is of greater value for lower lobe disease than for upper; the permanent paralysis which occasionally follows may cause anxiety if a thoracoplasty is eventually performed. Pneumoperitoneum is a valuable adjunct, especially when bilateral disease is present. While these methods of treatment may heal a cavity in the basal segment of the lower lobe, cavities at its apex in the dorsal segment often remain open, and the problem of the treatment of lesions in this part of the lung remains unsolved. It is unusual for abnormalities to be discovered at routine bronchoscopies, but if intrabronchial tuberculosis is found this may have an important bearing on treatment. Naegeli does not stress this point, nor indeed is endoscopy universally recommended.

Both surgeons pay tribute to Sauerbruch, Friedrich, and other pioneers of thoracoplasty, and discuss the various techniques which are in use. Finality has not been reached. The relaxation afforded by an apicolysis or Semb strip may not be as effective as the contramediastinal collapse which follows removal of ribs and transverse processes, and sometimes of costal cartilages too. Large cavities may require preliminary Monaldi drainage. Naegeli discusses extrapleural pneumothorax and its variants at some length. This is an operation which has always been more popular on the Continent than in England, and it is scarcely mentioned by Morriston Davies. On the other hand, the latter describes insertion of an inert plastic material to maintain permanent collapse. This, the most modern form of plombage, can be used to bring about a selective collapse of any part of the lung. The operation is done in one stage; it causes little shock and no paradoxical movement, and no refills are required. Preliminary reports refer to the relative freedom from complications, and if experience confirms this an advance of some importance will have been made. Morriston Davies prefers polythene strips contained in a pack to lucite balls, which are more rigid. The periosteum is stripped from the ribs and left attached, with the intercostal bundles, to the mobilized pleura; the plastic is put between these structures and the ribs.

Another recent development, also not discussed by Naegeli, is resection: lobectomy is occasionally performed, usually for a tuberculoma, but pneumonectomy is more usually performed for tension cavities in the lower lobe, bronchial stenosis, bronchiectasis, or disease with caseation rather than cavitation. With streptomycin to reduce post-operative complications resection may become the treatment of choice whenever indicated rather than a desperate last hope when all else has failed. Postural retention may reduce the size of cavities temporarily, making the patient fit enough for more extensive surgical treatment. The value of sanatorium treatment, carried out conscientiously and continuously, remains of the first importance.

[1] *Thorax*, 1948, **3**, 189.
[2] *Der Tuberkulosearzt*, 1948, **2**, 501.

INDUSTRIAL FLUOROSIS

The report[1] on industrial fluorosis to the Fluorosis Committee of the Medical Research Council is an interesting example of the way in which a research problem may be elucidated by the independent observation and intensive team-work of a few individuals. The first step leading to this very full investigation of local conditions, animals, and human beings was taken in 1943, when the occupant of a farm in Fort William, Scotland, situated about half a mile (800 metres) from an aluminium factory, complained that his sheep and cattle were suffering from an unusual form of debility in spite of there being an abundant supply of herbage.

Clinical examination of the affected animals by Professor G. F. Brodie, of the Royal (Dick) Veterinary College, Edinburgh, revealed that their emaciation and debility were due to dental lesions which prevented them from chewing their food effectively. The question of possible ill-health in human beings from pollution of the atmosphere by compounds given off by the aluminium factory was raised in 1944 by Dr. A. M. Fraser, medical officer of health of Inverness-shire, and later in the same year the Secretary of State for Scotland requested the Medical Research Council to conduct an investigation. For this purpose the Fluorosis Committee was set up by the Council in consultation with the Department of Health for Scotland. The investigation comprised analyses of the electrolytic process of manufacture of aluminium and of contamination of the air of the

[1] *Industrial Fluorosis—A Study of the Hazard to Man and Animals near Fort William, Scotland.* Medical Research Council Memo. No. 22, 1949. London: H.M.S.O.

factory and of the atmosphere, soil, herbage, and water of the surrounding area; study of the animals and of the local agriculture; and examination of selected groups of individuals in the factory and among the local residents and of the teeth of adults and school-children. The willing co-operation of the management and workers of the British Aluminium Co., Ltd., greatly assisted the task of the investigators.

The fumes containing fluorine, to which the disorder of the cattle was eventually traced, arise during the electrolytic reduction of alumina, which is dissolved in a bath of the fused fluorides of aluminium and sodium. At the time of the investigation the fumes extracted from the furnace rooms at the Fort William factory were not scrubbed or treated in any way but were allowed to escape from vents opening just above the level of the roof, drifting across the countryside as a dense white cloud of smoke. Inside the factory concentrations of fluorine as high as 3.6 mg. per cubic metre were found in the worst of the furnace rooms, decreasing to about 15% of this figure at a distance of 200 yards (180 metres) and to about 3% at one mile (1.6 km.). Contamination of the soil ranged from 1,010 parts per million in the immediate vicinity of the factory to 66 p.p.m. at 7 miles (11.2 km.) in the direction of the prevailing wind and 13 p.p.m. at 3.3 miles (5.28 km.) at right angles to the wind. Analyses of grass samples gave results closely parallel to those obtained from soil. The teeth of the animals reared on contaminated pastures showed mottling of the enamel, distortion, and deformity. Chemical analysis of teeth and bone showed an excessive fluorine content, and some cases of osteomalacia due to chronic fluorine intoxication were found.

Selected groups of individuals from the workers in the factory and from local residents were then subjected to clinical, radiological, haematological, and biochemical examination. Routine medical histories showed little evidence of an unusual rate of sickness or of organic disease. Radiological examination revealed abnormal appearances in the bones in a proportion—highest (25.4%) in the factory workers who had had the greatest exposure, low (4%) in the local residents, and absent in school-children. Within each broad age group the incidence of abnormalities tended to increase with the length of exposure to fumes. These abnormalities, though very variable in degree and unaccompanied by any clinical disability, resembled those described in the literature as skeletal fluorosis. Excretion of urinary fluorine was roughly parallel to the intensity of exposure. Some mottling of the teeth was found in 5.6% of the children examined, but mottling of a similar type was found in 3.1% and 0.6% of children in two country areas far removed from Fort William.

It is obvious that the severe loss of condition and drop in milk production in affected animals constitute a serious impediment to economic sheep and cattle farming in this area, and though the bone changes found in older factory workers were not associated with any clinical disability they must be regarded as a warning that exposure to fluorine fumes should be limited as far as possible. The report concludes with the recommendation that everything practicable should be done to reduce the amount of fluorine discharged from the factory.

G.P.s AND GERMAN MEASLES

That rubella early in pregnancy may cause defects in the human embryo has been one of the unpleasant surprises thrown up by medical research during the past few years. It is important to get far more exact information on this tragic complication of what is for the sufferer a mild complaint, and in our correspondence columns this week Professor A. Bradford Hill asks general practitioners to join with him in a piece of research from which it is reasonable to expect highly useful results. As Professor Bradford Hill points out, it is desirable to discover the frequency of congenital defects in children born of mothers who catch rubella during pregnancy, the severity of such defects, and their relation to the stage of pregnancy at which infection occurs, and the inquiry may well be extended to such infections as chicken-pox, mumps, and measles. Much of this kind of information could be secured through the Ministry of National Insurance without any breach of the confidential relationship that exists between patient and doctor. The way he proposes to make this inquiry is described in this week's correspondence columns by Professor Bradford Hill, and we hope that general practitioners will respond to the appeal made to them so that more may be known about this unfortunate sequel to German measles.

ROYAL SOCIETY AWARDS

The two Royal Medals for the current year have been awarded to Sir George Thomson, F.R.S., and to Professor R. A. Peters, M.D., F.R.S. Professor Peters was educated at Cambridge University and St. Bartholomew's Hospital, London, and was a pupil both of Sir Joseph Barcroft and of Sir F. Gowland Hopkins. During the war of 1914–18 he spent nine months as a battalion medical officer, and was awarded the M.C. (with bar), but was recalled for scientific work. In 1923 he left Cambridge, where he was Dunn lecturer in biochemistry, and became Whitley professor of biochemistry and a Fellow of Trinity College, Oxford. After early work with Barcroft on the specific oxygen capacity of haemoglobin, Peters turned his attention to vitamin problems, and his name is particularly associated with work on the vitamin-B complex. In 1930 came the first demonstration of the *in vitro* action of a vitamin—the specific response of avitaminous pigeon's brain to Vitamin B_1. This led to proof of the intimate connexion of this vitamin with the metabolism of pyruvic acid. During the recent war Professor Peters directed two teams of research workers on specific war problems. Out of this work came the highly important discovery of BAL or British Anti-Lewisite.

Among the other awards of the Royal Society is that of the Davy Medal to Professor A. R. Todd, F.R.S., for his work in organic chemistry and biochemistry, especially on the B and the E vitamins.

GENERAL PRACTITIONERS' REMUNERATION

Just before we went to press the B.M.A. received a reply from the Ministry of Health on the general practitioners' case for increased remuneration. It is published in the *Supplement* at page 218.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

FRACTURE OF THE CLAVICLE

BY

T. P. McMURRAY, C.B.E., M.Chir., F.R.C.S.Ed.

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Fractures of the clavicle occur more frequently than any other bony injury, and they are almost invariably the result of transmitted or indirect violence applied to the clavicle through a fall on the outstretched hand or on the elbow, or through contact with the tip of the shoulder. Although compound fractures of the clavicle are not unknown, especially in war injuries, yet this fracture is usually simple, even when resulting from a direct blow on the anterior surface of the bone.

Age Incidence

The fracture is one of the more active period of life, occurring mostly in youths and young adults. As it is commonly caused by a fall, it is usually seen in children or in those taking part in sport. In the elderly, fracture

Examining the clavicle for an ununited, or obscure recent, fracture. (From Mr. Hamilton Bailey's *Demonstrations of Physical Signs in Clinical Surgery*, by permission of the author and John Wright and Sons, Ltd.)

of the clavicle is a comparatively rare accident; at this age a fall on the outstretched hand is more likely to cause a Colles's fracture or an injury to the neck or head of the radius.

Site of Fracture

The fracture usually occurs slightly beyond the middle of the bone where the medial anterior curve meets the posterior curve of the outer segment. Here the strain is greatest. The fracture may also occur toward the inner or outer ends of the bone, the site of the lesion in the inner segment being usually at a point three-quarters-to one inch from the sternal attachment of the bone, while the site of the distal fracture is usually the same distance from its acromial attachment.

Symptoms and Signs

These vary according to the type of fracture. With a greenstick fracture, which is common up to the age of 14 or 15 years, the symptoms and signs are slight. Following a fall, the patient, usually a boy, may complain of an ache in the shoulder region but may finish the game he is playing with comparatively little discomfort. Later, persistent aching in the shoulder may draw attention to a clavicular swelling, tender on pressure, but causing little disability and no limitation of movement. Radiographic examination will confirm the presence of a crack in the bone, usually without displacement.

The symptoms and signs which follow a complete fracture in the usual mid-clavicular situation are more severe. The patient complains of a sudden pain in the shoulder region accompanied by a feeling of uselessness in the whole arm and forearm. As a rule, in order to relieve the pain the affected arm is immediately supported by the other hand in an effort to lift the shoulder and prevent the dragging weight across the site of fracture.

On examination of the site of injury it is evident that the clavicle has been broken. The outer sharp, irregular edge of the inner fragment of the bone can be felt projecting under the skin above its normal site, and restoration of the line of the clavicle is possible only by raising the shoulder above its normal position. The radiograph demonstrates that considerable displacement has occurred at the site of fracture, the outer fragment being displaced downwards and the outer end of the inner fragment projecting upwards, leaving a considerable gap between the broken ends.

The symptoms and signs of fracture at the inner or outer end of the bone are considerably modified from those which follow a lesion in the usual situation. As a rule, with either of these fractures there is little displacement and a minimum of deformity. Pain and disability following their occurrence may be so slight that the injury may easily be overlooked unless demonstrated by radiographic examination.

With a fracture close to the inner end of the clavicle impaction on one side of the bone is often present. Some thickening and tenderness are apparent over the injury and movements of the arm are limited because of pain.

When the fracture has occurred towards the outer end of the clavicle there is no displacement if the lesion is situated between the attachments of the acromioclavicular ligaments; tenderness and swelling over the site of injury and subcutaneous haemorrhage indicate the severity of the injury.

Common sites of fracture of the clavicle.

Diagnosis

The diagnosis is, as a rule, an easy matter if the possibility of this injury is borne in mind. The only difficulty is met with in the greenstick fracture of children and in the fractures occurring close to the extremities. A simple subperiosteal haemorrhage may cause some difficulty in clinical diagnosis, but the doubt can easily be settled by radiographic examination.

Complicated Injuries of the Clavicle

On occasion this fracture is accompanied by injury to some of the neighbouring tissues. Thus, fracture of the clavicle may be associated with a lesion of the brachial plexus, particularly of its upper components. After a fall on the point of the shoulder it is obvious that the patient

has sustained a fracture of the clavicle, and unless a careful examination of muscle movements is carried out an accompanying injury to the fifth and sixth cervical nerves may be missed. Because of the pain produced by the fracture the patient naturally keeps the whole shoulder at rest, and it is frequently difficult to separate the loss of power which follows injury to the plexus from the reflex inhibition produced by the fracture.

If the force applied to the shoulder is extreme the fracture may also be associated with a lesion of the whole of the plexus. In this event the differential diagnosis is comparatively simple, and is indicated by the complete flaccidity of the whole of the affected arm, with a loss of sensation over the entire limb below the elbow.

When the fracture has resulted from a violent pull on the arm in a position of full-extension the lower cord of the plexus may be stretched or torn, giving a loss of power in the intrinsic muscles of the hand—a complication which is very difficult to diagnose directly following the injury. Injury to the neighbouring blood vessels may occur also, usually not as a result of traction but following direct injury to the vessels by the sharp surface of the inner end of the outer fragment of the bone.

These injuries can all be diagnosed by a careful examination of the patient, and treatment of the fracture should be delayed until the possibility of these complications has been eliminated.

Treatment

The treatment of this fracture is not difficult, and if a few simple precautions are employed a successful result is to be expected.

Methods

Figure-of-8 Bandage.—The objects of treatment are to raise the shoulder to bring the two fragments of the broken bone into alignment; to pull back the shoulder to prevent overriding of the broken bone; and to restore full length, with fixation in that position until clinical union has occurred. The simplest and most generally satisfactory method of accomplishing these aims is by the use of the figure-of-8 bandage. Two or three large flannel or calico bandages are employed, passing round each shoulder in turn and crossing each other posteriorly. These bandages are applied firmly, the shoulders being pulled back by each turn of the bandage. When the bandages have been firmly fixed in this position by pinning or tying, a firm loop of bandage is attached to each shoulder loop in front across the chest. This simple method of retention keeps the original figure-of-8 in position and prevents the bandage slipping from the shoulder, which would destroy the fixation.

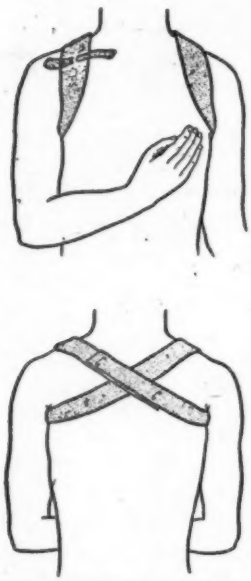

Diagram illustrating the pulling back of the shoulders without the anterior bandage support. (From Mr. George Perkins's *Fractures*, by permission of the author and Oxford University Press.)

When fixed in this way the patient is encouraged to use the hand, fingers, and elbow in order to prevent stiffness of these joints, a complication which is to be feared in the adult patient. After four weeks clinical union is usually satisfactory, and the patient may be allowed freedom from all control, gradually restoring full movements at all the joints by voluntary exercises. A sound, fully functioning limb is to be expected, with no disability except for the presence of a bony nodule at the site of fracture.

Occasionally, especially if the fracture has been comminuted, a spike of bone is present at the fracture site projecting under the skin. This spike should not be interfered with or removed, as it rapidly diminishes in size and gradually becomes rounded.

T-Splint.—To obtain the same fixation a T-shaped wooden splint may be used. This is placed on the patient's back, the long arm of the T extending from the sacrum to the level of the middle of the scapulae. The cross arms of the T extend behind each shoulder, and to these cross arms the shoulders are firmly bandaged, stability of the splint being obtained by fixing the main portion to the body and pelvis. The object of fixation and raising the shoulder can be attained equally well with the less cumbersome figure-of-8 method, and there are no special advantages in the use of the splint.

Strapping Method ("Sayre's").—This method of fixation by applying strapping round the arm and chest to pull back the shoulder and pull the elbow upwards and forwards has been gradually abandoned. It was the procedure generally adopted and taught in the textbooks for many years, but there are so many disadvantages in the method that it has now been largely superseded by the less troublesome fixation by bandages. In applying this form of treatment the arm was first pulled backwards and fixed to the chest by wide strapping, while by a second strap the elbow was pulled forward and upward with the hand and fingers firmly applied to the chest wall. The subsequent rigidity of all the joints of the limb usually required a long period of physiotherapy for their relief, and in many instances full movements could not be restored to the adult patient.

Treatment in Recumbency.—For those few patients in whom the presence of a nodule on the substance of the bone would be considered to be a great deformity, better alignment and a smaller mass of callus can be secured by treatment in recumbency. The patient is treated recumbent on a firm mattress with a small sandbag placed between the shoulders. This position is maintained for three to four weeks. As a result the alignment is improved and less callus is formed, but the confinement to bed for a month is usually considered to be unbearable for the treatment of a comparatively simple injury.

Intra-medullary Wiring.—An attempt has been made to restore and maintain the exact alignment of the bone by fixing the fragments in position by means of an intramedullary wire. This is introduced through an opening in the outer or inner fragment and threaded along the medullary cavity of both fragments. The method is not to be recommended; snapping of the wire has occurred on several occasions and the presence of the wire does not stimulate but rather retards bony union.

Sequelae of Fracture of the Clavicle

If treated by the simple figure-of-8 bandage without fixation of the hand and fingers the result is usually excellent. Full movements are gradually restored to all the joints and the patient is left with no disability. Under certain circumstances the result is not so satisfactory, and subsequent trouble and disability may be encountered.

Rigidity.—Limitation of movement may affect any of the joints of the upper limb, either as a direct result of the fall or as a consequence of inefficient treatment. At the

time of the accident the shoulder joint or the muscles of the shoulder region may be injured, and as full movements of the joint cannot be maintained until the fracture is united limitation of movement may become obvious when all fixation has been removed. The limitation may be reduced by the patient's own efforts during treatment, but massage and exercises may be needed at a later date.

A much more serious state of rigidity is encountered in those patients, especially adults, in whom the hand and fingers have been kept at rest during the course of treatment. Massage and voluntary exercises help to diminish the rigidity, but as a rule a considerable disability is left if the possibility is forgotten.

Non-union.—Non-union of a fracture of the clavicle is a comparatively rare complication, especially when the fracture is simple. It may occur in spite of correct and efficient treatment, but is usually seen only when treatment has been neglected or when a portion of the bone has been removed in a compound fracture. As a result of non-union the patient usually complains of aching and a feeling of clicking when the arm is used. There is usually little or no tenderness over the fracture, but the movements of the fractured surfaces on each other are disabling.

Treatment of Non-union

On occasion, union of the fractured bone can be obtained by continuing the fixation for a longer period. If the fracture is comparatively recent a further period of fixation of four to six weeks may be sufficient to produce a sound, painless union. When non-union has been present for a considerable period even prolonged fixation is usually unsuccessful in producing union, and operative interference is advisable.

Bone Grafting.—In attempting to produce bony union a bone graft is applied to the site of fracture. An inlay graft is placed in a deep slot cut on the antero-inferior aspect of the clavicle and reduction maintained as in a fresh fracture of the bone. Because of the difficulty of obtaining complete fixation of the fracture the bone-grafting operation may not be successful, and if the operation has failed on the first occasion the prognosis is much worse if a further attempt is made.

Partial or Complete Removal of the Clavicle.—If bone grafting has failed and the patient still complains of pain and disability a considerable improvement in the condition may be effected by the removal of a large section of the clavicle from either side of the fracture. As a result of this the painful clicking of the fractured surfaces is eliminated, and though the shoulder tends to fall forward to a slight degree the usefulness of the limb is increased. Because of the possibility of the re-formation of the clavicle which has been removed it may be advisable on occasion to remove the whole of the bone, which, though apparently a radical procedure, does little to reduce the strength and usefulness of the affected limb.

The Ministry of Health has notified hospital boards and committees that it will not set up any central machinery for dealing with redundant, worn-out, or obsolete equipment in hospitals. Boards and committees should dispose of such equipment as before. Serviceable items of equipment which become redundant in any hospital should be transferred to another hospital where they can be used. No cash adjustment should be made for the transfer, but it should be recorded. Hospitals holding equipment issued on loan during the war under the Emergency Hospital Scheme should use it where possible. Schedules of this equipment should be prepared and sent to the Ministry of Health, Supplies Division 1, Whitehall, London.

SURGICAL TRAVELS IN COLOMBIA

BY

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Surgical travels in other lands are full of interest, and are valuable for the development of understanding between the countries involved. Our country always welcomes the surgeons of other lands to her surgical centres, and many avail themselves of the facilities provided. Others find it impossible to make the journey, but they can be reached and helped when British surgeons undertake such a mission as is described in this paper. The National University of Colombia extended an invitation to Dr. Lawrence H. Morris and myself to visit Bogotá in order to deliver a course of lectures and perform surgical operations. This invitation was accepted, and we left England on April 26, 1949. As this is the first occasion such a visit has been made, it is felt that a record of it might be of interest.

Historical Background of Colombia

Colombia is the only country in the New World which bears the name of the discoverer, Christopher Columbus. The exploration of this region was carried out by his companions and contemporaries, and resulted in the foundation there of Santa Marta in 1525 and Cartagena in 1533. These ports developed into two of the most important centres of this vast continent and became the scene of many struggles and sieges in bygone days. In some of these expeditions Sir Francis Drake was actively engaged. The last great attack which Cartagena suffered in the colonial age was in 1741, when Sir Edward Vernon arrived at the head of the greatest army ever to reach the coasts of the Caribbean Sea.

Colombia was the cradle of the great Chibcha and Kimbaya Indian civilizations, which fell before the Spaniards. Santa Fe de Bogotá was founded by Jiménez de Quesada after a heroic expedition, and the future capital of the country came into being. Its history is bound up with the revolt of the Comuneros and the beginnings of Colombian science under Mutis and Caldas. Finally there came the great revolutionary movement organized by Bolivar, Nariño, and Santander, which transformed the country and ended in its independence being established. The Colombians have never forgotten the help they received from the British soldiers in their fight for freedom.

Geographical Facts

Colombia extends over an area of nearly half a million square miles of land in the north-western region of South America. It is the only country in this continent to face two great oceans, since its western seaboard opens on the Pacific Ocean while its northern coastline looks out on that portion of the Atlantic Ocean which forms the Caribbean Sea.

The outstanding feature of the country is the gigantic mountain ranges of the Andes, which rise in the Caribbean region and continue southward across the continent. This great mountain system spreads out into three main ranges, united in the south-west and opening towards the north. Thus on the left is the Western Cordillera of Chocó, in the middle the Central Cordillera of Quindio, and on the right the Eastern Cordillera of Sumapaz. Scattered among these mountain ranges are high tablelands where the population is denser, especially in the eastern region. To the east and south-west of the Eastern Cordillera is an immense plain traversed by the great rivers Caquetá and Vichada, which empty respectively into the Amazon and the Orinoco.

The country lies entirely within the Tropics, but the climatic conditions vary greatly. The line of the Equator traverses its southern part, but when the rivers, forests, and lowlands are left behind, temperate valleys and plateaux are reached where there is perpetual springtime with orchards and flowers in full bloom; and rising high above the plateaux are the mountains.

FIG. 1.—The San Carlos Hospital, Bogotá.

covered always with snow. The dry and wet seasons alternate at intervals of three months, starting with a dry period from December to February.

Colombia is a land of contrasts, and these are most striking when seen from an airplane. The landscape is always changing, revealing interwoven greens, browns, and blues. The huge mountain ranges, their jagged summits rising up against the sky, the rivers winding in the valleys, and the numerous primeval forests scattered throughout the country are an impressive sight.

The flora is abundant and diverse, and botanists affirm that more than fifteen thousand specimens have been described. Many of the wild plants, like the chupahuevo and matarrotón, are said to possess medicinal properties; and parasitic plants abound, notably the orchids which grow in rich profusion on the trunks of trees.

On the plains and in the valleys immense herds of cattle graze, and sheep and pigs are being reared on an increasing scale. Also, horses are imported from England to improve the local breeds. In the jungle there are various wild animals, including jaguars, tapirs, boars, deer, pumas, foxes, and bears, in addition to numerous species of monkeys and squirrels. The rivers contain the crocodile, the gliding eel, small salmon, the bagre, and the captain fish. Amongst the marshes and lakes are found waterfowl, heron, and wild duck, and on the moors quail, partridge, and pigeon. It is possible to see on the mountain crags a hawk or the rare condor. Many varieties of butterflies exist here, and numerous kinds of parrots, macaws, and parakeets.

There is a very interesting area known as the Macarena Hills, which is infested with monkeys and where yellow fever is rife. Consequently it has never been explored by man until recently. The control of yellow fever by inoculation has now made this possible. A research centre has been established with its headquarters in Villavicencia, and we had the opportunity of meeting and talking with the director of this work. A number of interesting biological investigations are being carried out, and it is hoped to extend these researches in the future. This appears to be a fruitful field for capable trained investigators.

The Travel Itinerary

We went to New York by sea, and, after spending one night in that city, travelled by air to our destination in Colombia. It was a grand flight over Miami in Florida, Cuba, and Jamaica: the beauty of the islands in the Caribbean Sea is most impressive. We reached Colombia at Barranquilla, a fine international port which is linked by the Magdalene River with the heart of the country. Here we received a warm welcome before proceeding by air to Bogotá, the capital city, where our main work was to be done. We were met by a deputation which included the Minister of Hygiene, the Director of the National Radium Institute, the representatives of the British Council, and a number of professors and doctors.

Bogotá is situated on the great plain—the Sabana de Bogotá—at a height of 8,500 feet above sea-level. It was established over 400 years ago, and is divided into old and modern sections, the former of which has a distinctly Spanish atmosphere, with narrow winding streets, big balconies on large colonial houses with gay patios, and peaceful little squares. Possessing a population of more than 600,000 persons, it is the centre of the political and cultural life of the country. The National University of Colombia occupies an area of 400 acres and has a large faculty of medicine. We spent four weeks working in Bogotá, and then left by air for Medellin, the capital of the rich department of Antioquia. This city was founded in 1674, and is recognized as one of the greatest industrial centres of Colombia. We worked in the University of Antioquia for three days and then proceeded by air to Cartagena.

Cartagena is a historic city of great grandeur situated on one of the beautiful bays of the Caribbean Sea. It is an important intellectual centre, with its university, the Academy of History, and the Naval School of the Colombian Navy. We spent a short period of two and a half days at work in the university. From Cartagena we went by air to the U.S.A. and attended the Joint Meeting of the American Proctologic Association and the Proctological Section of the Royal Society of Medicine, which was held in Columbus, Ohio. From Columbus we flew to New York and returned to England by sea.

Surgical Work in Bogotá

At the National University a large number of medical students are being trained. The curriculum extends over a period of six years, and after qualification resident appointments in the hospitals are available. Facilities are also provided for those who desire to make a study of special branches of medicine and surgery; these graduates often spend a period in the specialized clinics in England and the U.S.A. Many expressed a wish to come to England for this purpose.

The teaching hospitals vary greatly in size, the largest containing 1,200 beds. The treatment of cancer patients is mostly carried out in the National Radium Institute—a school of the University—whose director is a professor of surgery. This very active surgical centre also possesses a radiological department divided into therapeutic and diagnostic sections, a pathological department, and a statistical department. A large number of undergraduates attend the practice of this hospital.

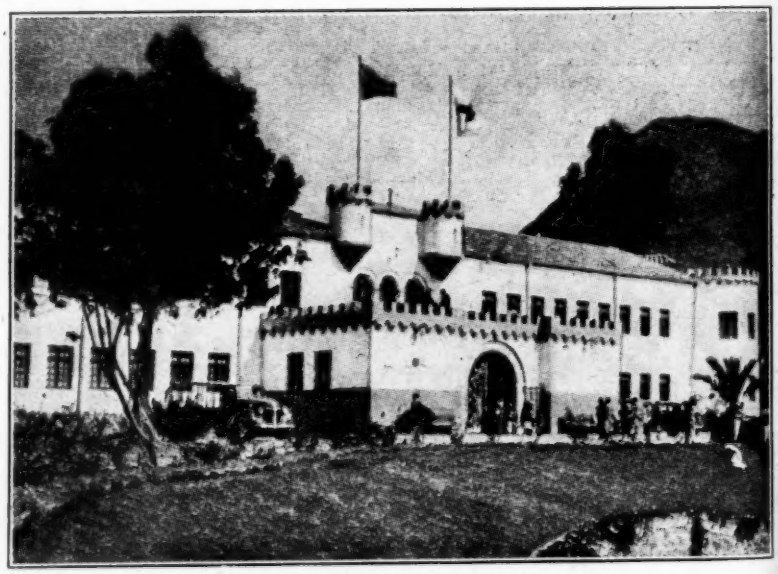


FIG. 2.—The Military Hospital, Bogotá.

An important addition to the hospitals in Bogotá is the new San Carlos Hospital (Fig. 1) for the medical and surgical treatment of tuberculosis. It embraces the most recent developments in hospital design, and is equipped with every modern device, including its own laundry. From its lay-out, especially in connexion with the wards and operation theatres, this hospital may be considered a model of its kind.

In addition to the civil hospitals there is the military hospital (Fig. 2)—a well-equipped institution beautifully situated amongst the hills.

The staffs of the hospitals are extremely keen and capable. A number of surgeons are engaged in various specialties, which include thoracic, gynaecological, and neurological surgery, urology, and proctology. In addition to routine undergraduate surgical teaching, clinical conferences and staff rounds are organized in each hospital and are well attended. On such occasions a number of patients with various lesions are shown and the diagnosis and treatment are discussed; or a definite subject is chosen and presented by a staff member, this being followed by a discussion. Original investigations are carried out in the laboratories, and facilities for pathological, clinical, and experimental research are provided.

There are two excellent clinics in Bogotá containing over 100 beds for the treatment of private patients. I was shown over them and was impressed with the facilities provided.

Most of our surgical work was carried out in the National Radium Institute, where every help was given by the director. Operations were also performed in the other teaching hospitals in the city.

The daily programme was a full one, the general plan being as follows. Surgical operations and anaesthetic demonstrations began at 8 a.m. and continued until 1 p.m. on four days a week, and until 11 a.m. on two days a week so that clinical meetings could be held. The staff were present at these meetings together with surgeons and doctors from other hospitals. The afternoons were devoted to discussions with staff members of hospitals, the examination of patients, or other work. Formal lectures were delivered daily at 6 p.m. in the faculty of medicine of the National University. These lectures comprised both general and special subjects. Amongst the former were such topics as "The Contribution of Great Britain to World Surgery," "The London Blood Transfusion Service," etc. The special group included the surgical treatment of cancer in various sites, anaesthesia, and lectures on war surgery. This was the first occasion on which lectures on surgery in war had been given in the country.

The National Academy of Medicine is an important learned society where papers embodying original work are presented. We had the privilege of addressing this academy at a special session. I also addressed the Congress of Gynaecologists meeting under the auspices of the Bogotá Surgical Society at its San José Hospital. In addition an address was given to the National Colombian Society of Gastro-enterology.

Medellin and Cartagena

The teaching hospital in the former city is San Vincente, which is a large and busy institution. Surgical operations and anaesthetic demonstrations were carried out and lectures were delivered in the medical faculty of the University of Antioquia.

At a special meeting of the academic council of the University of Cartagena it was pleasing to hear the Director of Education and the Rector speak of the close bonds of affection which have linked Great Britain and Colombia together over a period of many years. We worked in the teaching hospital of Santa Clara and lectured in the faculty of medicine of the University.

Malignant Disease in Colombia

During my stay I saw a large number of patients with malignant disease and also studied statistical reports. As in Great Britain, many of the patients apply for treatment when the disease is far advanced. It is important to establish an anti-cancer campaign there, and I discussed this subject with the profession. They are very anxious to develop this work, and realize the importance, both for the lay population and for doctors, of an educational programme dealing with the early symptoms of this disease. It is hoped that this work will soon begin, and that it will result in patients being treated much earlier in the disease than at present.

Regarding the incidence of various types of malignant disease, I was struck with the number of cases there were of sarcoma and other tumours of bone. All types of case were seen, and from the records there did not appear to be any outstanding aetiological factor.

Carcinoma of the cervix uteri is one of the commonest forms of this disease, and the same applies to the breast. A fair number of cases of epithelioma of the vulva and vagina are seen, and certain parts of the alimentary canal appear to be affected more frequently than others, common sites being the mouth, oesophagus, and stomach. As in this country, every effort should be made to diagnose carcinoma of the stomach much earlier in its development than at present. There appear to be fewer cases of carcinoma of the colon and rectum than with us.

General Impressions

The vastness and the grandeur of the country leave an indelible impression upon the mind of the visitor, and distances are such that air travel is essential. The medical profession received us with great friendliness, and it is a pleasure to recall the kindnesses we received. The hospital arrangements are good, with units varying in size up to a bed complement of 1,200. It is obvious that excellent surgical work is being done there, and the surgeons are keen and enthusiastic. There is a desire to progress and to learn new methods and techniques. It is hoped that facilities will be available for more of these keen young men to visit Great Britain and see the work here. Many Colombians wish to learn the English language, and in this and many other ways the British Council is doing excellent work.

It is a pleasure to thank the National University of Colombia for the invitation to undertake these travels, and also the University of Antioquia and the University of Cartagena for kindly asking us to visit them. The British Ambassador in Colombia gave us all possible help during our stay, and the Colombian Ambassador in London was most helpful in connexion with our visit. The medical profession in Colombia and many other friends showed us great kindness. The British Council made many arrangements for us, and its representatives in Colombia were most helpful throughout.

HEALTH EDUCATION

National Conference in London

Lord Woolton, president of the Central Council for Health Education, opened a two-day national conference at the Central Hall, Westminster, on November 8. The conference was attended by 700 delegates from local health and education committees and voluntary organizations, with many medical officers of health and directors of education. An exhibition, opened by Sir Arthur Hobhouse, chairman of the County Councils Association, was held in association with the conference. This was much more than the usual miscellaneous display of pictorial material. It was planned in five sections, comprising the nature, needs, environment, and diseases of man, and the social and health services, each illustrated by means of models, films and film-strips, charts, posters, photographs, and booklets.

At the opening session Professor ANDREW TOPPING, of the University of Manchester, made a striking contribution in which he blamed the medical profession for the general lay attitude towards sickness—namely, the attitude that anatomy, physiology, and pathology were esoteric subjects, beyond the comprehension of the layman. Admittedly under present conditions it was difficult for the doctor to find time for frank discussion with inquiring patients instead of making an arbitrary diagnosis and giving a scribbled prescription, but eventually he hoped that a large part of the resources of the medical profession would be devoted to the things that really mattered—the education of the public, the prevention of disease, and the control of the basic factors that produced disease.

It was an unpalatable fact, Professor Topping went on, that 90% of the minor illnesses from which we suffered were due to our own fault as individuals, parents, or members of the community. It was so easy for the ill person to consider himself a victim of something beyond his control, and there was still a regrettable tendency to "enjoy" ill-health, to be sentimentally avid for sympathy, and to be proud if one's illness was dignified by a high-sounding name. He believed that there was more scope for education in the field of infectious diseases than in any other. The vast majority of such diseases were avoidable by human endeavour. With one important exception—infantile paralysis—it was known exactly how infection was spread. The public should be told the facts in very simple language. He pleaded for an abandonment of the prudery which made the task of educating the public unnecessarily difficult. Euphemisms cut little ice. The public should be told in plain words how bowel diseases and food-poisoning originated and were spread.

Professor W. O. LESTER SMITH, of the University of London, emphasized the importance of the school nurse. A good school nurse exerted the influence of a missionary. It would be an admirable thing if once a year school doctors and nurses attended a staff conference with health education as the sole subject on the agenda, when every aspect of the curriculum could be brought under review in relation to problems of health.

Second Session

The second session was presided over by Sir WILSON JAMESON, who reminded the conference that the Central Council was the child of the Society of Medical Officers of Health. The policy of the Government was now to reduce its direct grants in the belief that the Central Council would have a more independent, and in some ways a more useful, role under the aegis of local authorities.

Mr. D. R. HARDMAN, M.P., Parliamentary Secretary to the Ministry of Education, discussed the task of the health educator. His function was not to teach facts or even to develop skills, but to encourage an attitude of mind which would attract the child or the adult of the community generally to the ideal of healthy living.

Dr. ROBERT SUTHERLAND, medical adviser and secretary to the Central Council, said that the Council was just emerging from a period of considerable despondency and frustration. About two years ago it was told that, for reasons which were quite logical, the Government proposed to reduce its direct grant, at the same time increasing its grants to local authorities in the expectation that from such authorities there would be increased support for health education. The associations of local authorities, with which the subject was discussed, felt that they could not ask their individual authorities to double their subscriptions, as has been suggested, in order that the Central Council might not only maintain its existing services but improve them. The Central Council had been obliged to review its functions and to make very serious retrenchments, which was uncomfortable for everybody concerned. He believed, however, that as a result of this experience it had gained new life and new force and had directed its services into channels of even greater value.

Those who were working in preventive medicine, Dr. Sutherland continued, had been going through a similar experience as a result of the changes which had been brought about by the National Health Service Act. Many public health workers had felt that a large part of their life's work had been taken from them. He believed that such a period of tension was a necessary preliminary to a new orientation and re-direction of effort and a great surge forward into new fields of activity. There was every reason to believe that the local authorities, and those concerned with preventive medicine and with the teaching hospitals, and with education generally, were awakening to a new realization of the scope of health education in their own fields.

Professor R. H. PARRY, of the University of Bristol, said that they all hoped that the family doctor in the future would have sufficient time to be also the family friend and adviser. A healthy adult, however, did not need expert medical knowledge to maintain his fitness and lead a healthy life. "There is no need for him to qualify as a doctor—in fact, life tables prove that he would shorten his life by so doing." What he wanted was a sound knowledge of elementary biology. He must know the capabilities of his own body, and he might need an occasional word of advice on special problems that arose. Professor Parry went on to criticize certain forms of sex education. He was convinced that sex lectures to classes in senior schools often did more harm than good, merely stimulating the curiosity of the child. Training in biology in schools should supply sufficient knowledge, so that with a little further instruction, preferably from parents, the child or adolescent could understand his personal problems.

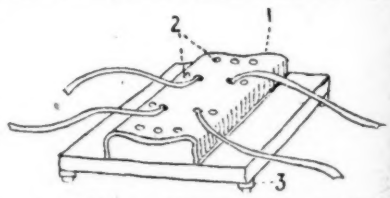
Conference Dinner

Lord Woolton presided over a dinner held in connexion with the Conference. He mentioned that it had been his hope as Food Minister that the children of the country would go through the war unscathed. If they had come through rather better physically than they had been at the beginning it was a matter for great thankfulness. Dr. Charles Hill, in proposing the toast of "The Guests," said that there could be no greater tribute to the Central Council for Health Education than the distinction of the guests, who included the Lord Chancellor, representatives of the Ministries of Health and Education, of the departments of public health and social medicine at the universities, and of the associations of local authorities. Viscount Jowitt made a response in a jocular vein in which he said that the real test of the value of the doctor was to see what happened when the patient had not done what he advised. Mr Walter Elliot, M.P., proposed the health of local authorities, and expressed the hope that in future they would be more closely concerned with health education. Sir Howard Roberts, clerk to the L.C.C., said that local authorities needed all the "health" they could get. They had undergone some severe operations, with the removal of some of their health functions, though health education was still left to them. Sir Wilson Jameson, Chief Medical Officer of the Ministry of Health and Ministry of Education, said that the Central Council had been able to attract the help of large numbers of able and public-spirited people who had given generously of their time. In particular an immense debt of gratitude was due to Dr. Charles Hill, a former president of the Council, for the work he had done in public health education. Other speakers were Dr. Maurice Williams (president, Society of Medical Officers of Health), Mr. F. L. Freeman (president, Association of Education Officers), Dr. E. K. Macdonald, and "Fougasse" of *Punch*.

Preparations and Appliances

WEIGHT-BEARING DEVICE

Dr. W. S. TEGNER, physician to the Arthur Stanley Institute for Rheumatic Diseases (Middlesex Hospital), writes: The apparatus here illustrated has been designed by two physiotherapists of the institute to replace the conventional roller-skate as a means of obtaining non-weight-bearing movement, especially in the hip-joint after vitallium-mould arthroplasty. It has the advantages over the roller-skate of being designed for the job, of being mobile in all directions, of having a wide base, and of being easily used even when the limb is in plaster. It consists essentially of a wide-grooved wooden plate lined with "sorbo" rubber and diffusely perforated to allow of firm fixation by bandage to different sizes of limbs. While it has proved particularly useful in treatment after hip arthroplasty, it has also a wide range of other uses when non-weight-bearing exercises are required. It is being made by Messrs. Stanley Cox, and will be known as the Boltworth skate.



1, Rubber-cushioned surface for limb. 2, Variety of holes for ties. 3, Ball castors.

AUREOMYCIN AND CHLOROMYCETIN

The Ministry of Health has issued the following memorandum:

These drugs are scarce and costly. Their use can be justified only for conditions in which they are considered likely to be beneficial. To ensure that the available supplies are used to the best advantage, the Ministry of Health has arranged to purchase all available supplies of both drugs and to distribute them through regional hospital board centres previously used for distribution of streptomycin. Hospitals outside the National Health Service will be able to obtain supplies of aureomycin and chloromycetin from these centres on payment. These arrangements will operate from November 21, 1949.

On the advice of the Medical Research Council it has been decided for the present to confine the use of these drugs to the treatment of the following conditions:

Aureomycin.—Suspected cases of ornithosis; proved cases of undulant fever (brucellosis), lymphogranuloma inguinale; severe cases of atypical pneumonia in which there is good reason to believe that the cause is a virus.

Chloromycetin.—Suspected cases of ornithosis; proved cases of undulant fever (brucellosis), lymphogranuloma inguinale, typhoid fever, paratyphoid fever (severe), salmonella septicaemia.

These categories are under constant review and may be added to from time to time in the light of current expert advice.

The Regional Distribution Centres are listed below.

Aureomycin and Chloromycetin Distribution Centres

Area No. and Board	Distribution Centre	Tel. No.
Area No 1 Newcastle R.H.B.	Newcastle-upon-Tyne General Hospital, 418, Westgate Road, Newcastle, 4	Chief Pharmacist New. 35211
Area No. 2 Leeds R.H.B.	Leeds Blood Transfusion Laboratory, The Bridle Path, York Road, Seacroft, Leeds	Leeds 45091/3
Area No. 3 Sheffield R.H.B.	City Hospital, Hucknall Road, Nottingham.	Nottingham 66292 (3 lines)
Area No. 4 East Anglian R.H.B.	Addenbrooke's Hospital, Cambridge	Chief Pharmacist Cam. 4451
Area No. 5 N.W. Met. R.H.B.	West Middlesex Hospital, Twickenham Road, Isleworth, London	Chief Pharmacist Hounslow 2311
Area No. 6 N.E. Met. R.H.B.	Mile End Hospital, Bancroft Road, London, E.1	Physician Supt. Advance 2873/7
Area No. 7 S.E. Met. R.H.B.	Grove Park Hospital, Lee, London, S.E.12	Lee Green 1077/8
Area No. 8 S.W. Met. R.H.B.	South London Blood Supply Depot, Benhill Avenue, Sutton, Surrey	Vigilant 0068
Area No. 9 Oxford R.H.B.	United Oxford Hospitals, Churchill Hospital, Headington, Oxford	Chief Pharmacist Oxford 48651
Area No. 10 South Western R.H.B.	Ham Green Infectious Disease Hospital and Sanatorium, Bristol	Bristol 31165
Area No. 11 Wales R.H.B.	City Isolation Hospital, Canton, Cardiff	Medical Supt. Cardiff 960
Area No. 12 Birmingham R.H.B.	Selly Oak Hospital, Birmingham	Medical Supt. Selly Oak 1361
Area No. 13 Manchester R.H.B.	Manchester Royal Infirmary, Manchester, 13	Chief Pharmacist Ardwick 3300
Area No. 14 Liverpool R.H.B.	Fazakerley Sanatorium, Liverpool, 9	Medical Supt. Aintree 2324

The Joint FAO and WHO Expert Committee on Nutrition held its first session at Geneva on October 24–28 under the chairmanship of Lord Horder. The committee recommended devising other methods of supplying prophylactic doses of iodine than adding it to table salt, especially in undeveloped areas. WHO is to gain information on the prevalence of pellagra, and to conduct an inquiry into the various forms of kwashiorkor. A recommendation was addressed to FAO on the preparation of an international code of analytical methods for the determination of vitamins in foodstuffs. The following were the members of the Joint Committee: Professor G. Bergami (Italy), Professor J. F. Brock (Union of South Africa), Professor Josue de Castro (Brazil), Professor M. J. L. Dols (Netherlands), Lord Horder (United Kingdom), Dr. V. N. Patwardhan (India), Dr. J. Salcedo (Republic of Philippines), Dr. W. H. Sebrell (U.S.A.), Dr. Hazel Stiebeling (U.S.A.), Professor E. F. Terroine (France).

Reports of Societies

NEONATAL PNEUMONIA AND TOXOPLASMOSIS

At a meeting of the Liverpool Medical Institution on October 20, with the president, Professor Charles Wells, in the chair, Dr. A. H. CRUICKSHANK read a paper on "Experimental Studies of Neonatal Pneumonia."

Lantern slides illustrating some of the common conditions affecting the lungs of babies who had died at birth, or within a few days of birth, were first shown. These included macroscopic views of atelectatic lungs with marked intersutial emphysema, microscopical views of polymorphonuclear cells in the alveoli of a stillborn infant, inhaled squamous debris from the infant's own skin, macrophages filled with phagocytosed meconium, and alveoli lined by hyaline membrane. These appearances were then discussed in relation to the respiratory movements that have been observed clinically and experimentally by various workers. Some authorities had suggested that the unborn human infant normally inhaled amniotic fluid. The results of experiments in which amniotic fluid, and its various constituents and contaminants, had been introduced into the lungs of adult rabbits by intratracheal injection were then presented. Meconium was shown to have a harmful effect by virtue of the intensely irritant bile salts which it contained. The desquamated squamous cells found in human amniotic fluid were then shown to be capable of causing a foreign body giant-cell reaction in rabbits' lungs; and, finally, collapse and leucocytic migration were demonstrated after the injection of cell-free, sterile, rabbit's amniotic fluid. A similar reaction was obtained after the injection of normal saline solution.

It was concluded that it must be abnormal for amniotic fluid to reach the infant's alveoli, and that it did so only as a result of a difficult labour, or of some other cause of foetal asphyxia. If the reaction in the lungs of adult rabbits was an index of the reaction in infants' lungs, inhalation of much amniotic fluid would be likely to cause a fatal atelectasis. In four or five days' time a foreign-body reaction might be found experimentally, but such a reaction was rarely noted in material from human infants in the neonatal period. That a foreign-body reaction could occur in a baby was shown in a slide from an infant surviving for four days with amniotic debris in its lungs. The rarity of such a finding pointed to the rarity of survival for as long as four days in these cases.

Toxoplasmosis

Dr. A. MACDONALD read a paper on toxoplasmosis, in which he discussed the laboratory diagnosis of the condition by methods including the serum neutralization test on the chorio-allantois of the developing chick and a complement-fixation test using antigen prepared from infected chick embryo tissue. Three cases of congenital toxoplasmosis in Liverpool gave similar results with both types of test. Positive complement-fixation tests were obtained in three out of 100 "normal" sera, presumably as a result of symptomless infection. It was difficult to assess the significance of a positive test in patients who had only one or two of the clinical signs often associated with the disease. Preliminary investigations showed an increased incidence of positive complement-fixation tests in infants with anencephaly, chorio-retinitis, and mental retardation, as compared with normal children. He emphasized that blood from both mother and infant should be examined preferably by at least two types of serological test.

In the discussion which followed, Professor N. B. CAPON discussed the possibility of other infections besides toxoplasmosis damaging the embryo and foetus. Dr. J. BERKSON said that from 1943 onwards there were frequent references in the American ophthalmic journals to the retinal changes due to toxoplasmosis. The pictures illustrating the retinal lesions accompanying these articles did not appear to him to differ from those seen regularly in the past and labelled congenital

coloboma, or old congenital choroido-retinitis. One of the three cases discussed by Dr. Macdonald was a patient of Dr. Berkson's, seen in March of this year. He was a boy aged 9 who presented a convergent strabismus in a microphthalmic eye, with a large area of old choroido-retinitis. He appeared to be mentally defective. The case was shown to the speaker's colleagues as a case of toxoplasmosis, and *x*-ray examination of the skull showed areas of cerebral calcification. Dr. Macdonald finally confirmed the diagnosis by showing a positive serological reaction in the boy and in his mother.

Dr. H. G. FARQUHAR said that the incidence of toxoplasmosis in man was not accurately known. It was a common parasite of animals, being found in cats, dogs, mice, rabbits, canaries, and sparrows, as well as in many other animals. Clinically, it appeared to occur in man in four more or less distinct forms: (1) a congenital infection, in which the foetus was affected *in utero*; (2) an encephalitis affecting older children; (3) an acute febrile illness in adults with a rash rather similar to that of typhus, and with a high mortality; (4) an apparently symptomless form affecting adults, which could often only be diagnosed by specific tests, but which might be confirmed in the female by the birth of a child affected with the disease. The diagnosis could be confirmed by finding the parasite in the blood, the cerebrospinal fluid, or post-mortem in the tissues. Tests for antibodies also helped in the diagnosis. Since the incidence of this disease was not known, and the mode of transmission was also in doubt, it was desirable that any case showing some or all of the known symptoms should be investigated with the diagnosis of toxoplasmosis in mind. Every effort should be made to find whether there had been any contact with an infected animal.

NORTH OF ENGLAND OBSTETRICAL AND GYNAECOLOGICAL SOCIETY

At a meeting of the North of England Obstetrical and Gynaecological Society held in the Jessop Hospital, Sheffield, on October 21, the chair was taken by the president, Mr. S. B. Herd.

Professor A. M. CLAYE described a case in which a sewing needle, which was not of surgical type, had been removed from the abdominal wall fourteen years after he had performed total hysterectomy for multiple fibroids.

Dr. T. SMITH discussed as "an unusual ovarian complication of pregnancy" a case in which an adherent ovarian mass had been removed from the pouch of Douglas. The patient was four months pregnant. On section, decidua-like tissue without demonstrable endometrial tissue was found, and the suggestion was put forward that the mass was a decidual tissue tumour arising from an ovarian endometrioma.

Dr. F. J. MILLYARD described a case of "uterine carcinoma *in situ*." The patient, aged 48, had had irregular uterine haemorrhage for one year and had uterine enlargement corresponding in size with a three-months pregnancy. On hysterectomy a gross endometrial hyperplasia was found which on section showed a non-penetrating carcinoma of the endometrium.

Dr. C. R. MACDONALD gave details of a case of the rare benign haemangioma of the uterus which he had treated by hysterectomy.

Dr. WILLIAM HUNTER discussed the diagnosis and treatment of "double uterus," and confined his remarks to cases in which two separate and distinct uterine cavities had been demonstrated, excluding cases with a rudimentary uterine horn. He had based his studies upon an analysis of a series of 27 cases and a survey of the literature.

Dr. Leslie G. Housden, member of council of the Save the Children Fund and one of its medical advisers, is shortly leaving England to visit the Sudan and British Somaliland on behalf of the Fund. He will survey conditions of child life there in order to see how the Save the Children Fund can best respond to appeals for help which have reached it from the Governor-General of the Sudan, the Colonial Office, and the Governor of British Somaliland.

Correspondence

Sunday's Wonder Drug

SIR,—Your leading article on streptomycin in the current issue of the *Journal* led a reporter of the *Sunday Express* to ring me and ask my view upon it. I gave him my opinion in the following words:

> The warning against the present somewhat indiscriminate use of streptomycin is very opportune, even though the general assessment of value of drug is on the pessimistic side. The story of streptomycin illustrates once more the tendency to overstate the range of usefulness, and to understate the toxic or side-effects, of new remedies. Actually, as the article states, the range of useful action is less than penicillin and the degree of undesirable side-effects is greater. The moral is (1) accurate diagnosis of the patient's condition; (2) forbearance in the use of any new drug till its limits are known; (3) careful oversight during its administration.

The reporter thanked me and said this was just what he wanted. But my opinion was not published, as no doubt the Editor considered it spoiled the story he was bent upon telling. —I am, etc.,

HORDER

Virus Diseases in Pregnancy

SIR,—May I use your columns to appeal to medical practitioners to treat me with forbearance and to give me a little help in an inquiry that I am making into the possible effects upon the foetus of certain infectious diseases in the mother during pregnancy?

The position is this. There is, I believe, no doubt whatever that rubella early in pregnancy can cause defects in the child. What we do not know with any pretence to accuracy is the frequency with which the disease, occurring at different stages in pregnancy, will lead to such abnormalities. We can hardly talk of therapeutic abortion as being necessary for a woman who suffers from rubella during the first three months of her pregnancy (and such a step *has* been proposed) unless we know how often the child subsequently born has congenital defects and with what severity. That is not easy to find out. It implies the observation of an attack of rubella in a pregnant woman particularly in the first few weeks of pregnancy before she usually comes under medical observation, and a subsequent study of the child born.

Earlier this year Dr. T. McL. Galloway and I published a few observations of this kind (*Lancet*, 1949, **1**, 299). I am now hoping to extend them with the assistance of the Ministry of National Insurance, and at the same time to include some other infectious diseases the possible effects of which we do not know. The technique I have adopted is as follows. An insured woman in employment may be certified by her general practitioner as being absent from work through an attack of rubella, chicken-pox, mumps, or measles. The local office of the Ministry of National Insurance automatically receives a record of the illness and will make a special note of it whenever it bears one of these diagnoses and relates to a married woman. The same woman may claim maternity benefit for a birth that takes place within 12 months of the beginning of this previously recorded illness. In such circumstances the Ministry of National Insurance has an automatic record of the "double event"—a specified illness occurring at a specified date during (or just before) pregnancy and the date of birth of the child.

When this double event occurs the Ministry will notify me of the occurrence, but to ensure that the practitioner's certificate remains entirely confidential I shall *not* be given the name of the woman concerned. All that I shall know is that such an occurrence has taken place in the practice of one Dr. A. B. The Chief Medical Officer to the Ministry of National Insurance will himself send the name of the patient to Dr. A. B. with an explanation of the circumstances. At the same time I shall write to Dr. A. B. to ask whether one of my medical colleagues may visit him (or her) to discuss the nature of the

congenital defects, if any. In the first instance the inquiry will be limited to the London and Home Counties area.

Cases of infectious diseases in the pregnant woman are uncommon, and I shall be surprised if I secure, all told, more than a hundred cases in a year. In short, I am unlikely to weigh down any general practitioner with work, but I have all the more reason to endeavour to lay hands on every case I can. I hope the relatively few medical practitioners to whom I shall have to write will listen sympathetically to my plea. Of course I would not say no to any doctor who might care to offer assistance personally by recording cases outside the sphere of employed married women, to whom my scheme is necessarily limited. But my request is not, in fact, for that help but for something very much slighter, yet essential if an important problem is to be solved.—I am, etc.,

Department of Medical Statistics, London School of Hygiene and Tropical Medicine, London, W.C.2. A. Bradford Hill.

"Mantoux-conversion"

Sir,—I strongly support Dr. Charles Newman's plea (November 12, p. 1111) for the avoidance of two words, "conversion" and "inversion," for the same process. His criticism of my importation of "inversion" is right; referring frequently to the Scandinavian literature on B.C.G., I had fallen into their usage of the word. I agree with Dr. Newman that etymologically "conversion" is correct and join with him in hoping that "our Scandinavian friends . . . will be willing to drop the term 'Mantoux-inversion.'" I myself shall do so in future.

But a more difficult point arises over a word for a person who undergoes conversion or reversion, and I should welcome advice on this. The Scandinavians use "inverter" and "reverter" (Dr. Konrad Birkhaug, of New York, spells them "-or" in his foreword to my book). Though "reverter" is allowable, is "converter"? The purist would insist that it should be "convert," but this has a religious connotation. Some may even argue that it should be "convertee," but I refuse to assist at the birth of so monstrous a word.—I am, etc.,

Henley-on-Thames. K. Neville Irvine.

Modern Trends in Radiology

Sir,—Whatever may be the merits and demerits of mass radiography, Dr. J. F. Brailsford (October 1, p. 724) is to be commended for his courageous attack on the abuse of radiology in general. Apart from the fear of litigation, the main reasons for this abuse are as follows.

First, there is the scientific neo-mediaevalism which believes that an *x*-ray film is bound to "show something." The most flagrant example is the incessant demand for *x*-ray examination following injuries, however slight, to the front of the chest adjacent to the sternum, regardless of the elementary fact that costal cartilage is radio-transparent. Secondly, as has often been said, slavishness to the machine has caused a deterioration in clinical examination and the eclipse of logical thought. Medical teachers continually deplore this state of affairs but seem powerless to remedy it. Thirdly, ambition, pride in craftsmanship, and commercial competition—admirable motives which in other spheres of activity increase the national wealth—in medicine inevitably lead to perpetual expansion out of all proportion to the practical results achieved.

Before the appointed day this country had a flourishing export trade in films. Since that day the supply has been insufficient to meet home needs. The Ministry, instead of using this shortage to bring doctors, auxiliaries, and the public to their senses, stimulated home production and imported films from abroad. Twice within a few weeks I have been urged to lay in a stock of Belgian films. Thus workers have been drawn from the creation of wealth and the balance of trade in films has been reversed to our economic disadvantage, with no gain to our standard of health. I cannot imagine that the Belgians indulge in this extravagance, and from all accounts they are better fed than we are. Their sense of values is evidently superior to ours. It is quite impossible to make the younger generation understand the simple fact that every film expended through carelessness or ignorance or merely for the satisfaction of personal ambitions makes our food dearer and lowers our standard of living.

Even the appeal to self-interest falls on deaf ears. The machine costs money—in labour, replacement, and consumption of materials. Honorary staffs of voluntary hospitals were independent of their hospital's resources. Now all payments come from the same source and the total sum is limited. It stands to reason, therefore, that the more that machines are used instead of brains the more of this sum will be used to pay the machines and the less will be left to pay the brains. We cannot have it both ways.

These things are very, very simple, so simple that I am almost ashamed to mention them. Yet perhaps their simplicity is the reason why they are not understood.—I am, etc.,

Cambridge. Ff. Roberts.

Sir,—As radiologist to a provincial hospital group I would like to support Dr. J. S. Gemmill's admirable letter (November 5, p. 1046). Dr. Brailsford's crusading zeal is well known, but there is a vast deal of truth in what he says. Diagnostic radiology must be complementary to clinical medicine. It can never be a substitute for it. The number of cases a doctor refers for an *x*-ray examination is often in inverse proportion to his clinical ability. Requests are constantly being made for elaborate and multiple *x*-ray examinations of several systems without any adequate clinical investigation.

I have been impressed in the last few years by the increasing number of patients—particularly with chest conditions—demanding *x*-ray examinations, not because of disease but because of the fear of disease. Radiology is a very expensive method of investigation and reassurance. The ever-increasing demands made on hospital departments and the flooding out of the department with unnecessary work can only hinder that leisurely and detailed investigation of the case in which radiology can help. For the same reason the all-important consultation with one's clinical colleagues is made so much more difficult. In the last analysis it is the radiologist who alone can appreciate the clinical facts, the help, and, still more, the limitations of his specialty.—I am, etc.,

Eastbourne. E. Owen Fox.

Sir,—The material presented in my paper (October 1, p. 724) was not the provoked outburst of an enthusiast but the gleanings from many years of careful observations, applied research, and approved opinions obtained in discussions with eminent clinicians both here and in America. I see no evidence in the criticism to alter the views expressed.

It would have been courteous to your readers, particularly in these days of paper shortage, if the critics had given evidence that they had studied my article and the material in the papers to which I referred, which answered their criticism, before writing their letters. The sole reason for the references was the desire to avoid repetition and save valuable space in your *Journal*. It is particularly noticeable that my critics have taken certain passages from their context, put their own interpretations, not mine, on their significance, and then called it nonsense—even I agree with them. Thus, in my article I stated that "there would be fewer errors in interpretation of radiographs if radiology was always preceded by a *sound* clinical examination," and Dr. Peter Kerley (October 15, p. 870) states, "It is not misinterpreting Dr. Brailsford to summarize his views on the diagnosis of tuberculosis and carcinoma as follows—wait until the patient has a big haemoptysis or a palpable tumour." Would it not be reasonable to point out that, if this is the standard of his clinical examination, what he does not know about clinical medicine is practically all there is to be known?

It is amazing to me to see that men engaged in these mass examinations fail to appreciate the mental and physical pain which their activities produce. I need produce no other facts or figures to condemn mass radiology than those provided by Dr. Peter Kerley. He states that three and a half million people were examined by mass radiography and that "as a result of the initial examination 13,401 were found to be suffering from active tuberculosis necessitating treatment. Samples of these patients compared with samples of patients reporting with symptoms to chest clinics have shown that those detected by mass radiography require from six to seven months' treatment before returning to work, as against 18 months to two years

required by those reporting to chest clinics." Since we have been told that most of the cases detected by mass radiography had no signs or symptoms, and since by far the greater number of these cases have had tuberculosis and must have recovered from it without having had any treatment, was it necessary to keep them in sanatoria for six months before sending them back to work? (We have 5,669 beds in sanatoria empty because of the shortage of nurses.) On the other hand, of the cases referred for radiography by the general practitioner because of signs and symptoms, many show so-called minimal lesions, but even with prompt sanatorium treatment progression continues for a time, and few would be considered by the tuberculosis officer to be fit for work in six months' time—some die though every expedient is used.

Dr. Kerley's second statement is open to even more serious criticism. He states, "A still larger group of individuals with minimal tuberculous lesions or lesions of doubtful activity detected by mass radiography have been kept under observation while at work." Why? Perhaps the best explanation can be obtained from the cases cited in the Prophit Tuberculosis Survey.[1] Take, for example, Case 108:

"English nurse. *X* ray normal in September, 1938. In April, 1942, doubtful shadow below right clavicle—in September, undoubted lesion. No symptoms, no clinical signs of activity. Remained on duty. January, 1943, definite spread and probable commencing cavitation. Feeling quite fit; E.S.R. 10. In March, 1943, further spread, and definite small cavity. The nurse still had no symptoms, and was still on duty. The following month, *while on holiday* (my italics), she complained of increasing malaise, persistent cough and sputum, and huskiness. In July, 1943, the infraclavicular cavity was larger and well defined and sputum was found to be T.B.+. A.P. was then induced"

In the face of the radiographic evidence of progressive disease, why was the nurse kept on duty? We must believe either that the statement that she had no symptoms was false, that the clinical examination was poor, or that the holiday caused the symptoms. Is it not possible that she tried to hide the symptoms and that the medical officer, short of nurses, too readily accepted the statement? The detection of the early lesion by radiography did not secure her treatment: this she got, in spite of radiographic evidence of progressive disease, only after she had developed signs of a severity which could not have escaped the clinical acumen described by Dr. Kerley.

Dr. S. Cochrane Shanks and Dr. Peter Kerley are advisers to the Ministry of Health on radiography, and neither they nor their assistants can be said to be free from vested interests. They are obviously angry that I should suggest that in these days of bankruptcy, when we have 5,669 empty beds, their service, which merely finds a few more cases they have not the means to treat, should be abandoned and the money devoted to those purposes which raise the resistance to the disease. From their concerted statements—"It is deplorable that such nonsense should have been given space in a scientific journal" (October 15, p. 870)—they indicate clearly that if they had the power they would prohibit it. Many distinguished clinicians have expressed entire approval of my constructive criticism.

Material from most radiographic departments could be obtained which proves the lack of judgment, skill, and knowledge on the part of certain doctors in carrying out on patients the procedures the significance of which I suggested students might learn by performing on each other. Is it nonsense to say to such people, "You have it done to yourself by someone as incompetent as yourself and see if you would then think it justifiable"?

Dr. F. Kellerman (October 15, p. 870) need have no fear for the reputation of British medicine in my hands. Constructive criticism of trends is not condemnation of the whole. The many honours bestowed upon me before and during my extensive tour of the U.S.A. were in acknowledgment of my contributions to the literature, and I can assure him that I have every reason to know that I left in every State an enhanced opinion of British medicine.

Edgbaston, Birmingham. JAMES F. BRAILSFORD.

REFERENCE

1 *Tuberculosis in Young Adults*, 1948, London.

*** This correspondence is now closed.—ED., *B.M.J.*

Use and Abuse of Vitamins

SIR,—In his article on the use and abuse of vitamins (November 5, p. 1036) it is noteworthy that Professor L. S. P. Davidson never refers to the human factor. He is satisfied that the general practitioner, if adequately trained in the science of nutrition, is the proper person to give advice to the family on how to eat, when to eat, and what to eat. Is he as well satisfied that the family will accept the advice?

Every doctor in touch with the people knows that they will eat what they like when they can get it, and will not eat what they do not like unless they are hungry and can obtain nothing else. It is obvious that if the populace was sufficiently regimented to conform to the instructions of the dietitian (and how these dietitians can disagree) there would be no need of vitamin preparations except in infrequent cases.

I know what my patients should eat. I advise, but I am well aware of what they really do eat and what they will not eat. They are not cranks, merely a cross-section of our population. Taking these people as we find them, desiring to help them, and knowing that health propaganda, particularly in the field of dietetics, is likely to be tedious and show little effect in our lifetime, it is found necessary to prescribe vitamin preparations much more frequently than would appear to be necessary from Professor Davidson's article.—I am, etc.,

Hexham, Northumberland. RICHARD BELL.

Teaching of Physiology

SIR,—It is unfortunate that Dr. M. Beddow Bayly (November 5, p. 1048), whether wilfully or unconsciously, completely missed the point of Professor D. H. Smyth's letter (October 8, p. 813) on this subject. This was a plea that the medical profession as a whole should help to guide public opinion so that at least some fraction of the hundreds of thousands of cats and dogs destroyed annually in this country should be made available for physiological teaching and research, on which, ultimately, all advances in medicine depend. Instead, Dr. Bayly concentrated on the word "restrictions," referring to them as "undesirable restrictions," and proceeded to fill a column in asking why they were undesirable. Professor Smyth had neither suggested nor implied such an idea. In common with all physiologists in this country, he knows that the restrictions imposed by the Home Office are highly desirable, for they afford the protection of the law against interference from the antivivisectionists. They offer no hindrance to research, since little of physiological value could be obtained from experiments on animals in acute emotional distress.

It is possible that Dr. Bayly is himself a member of an antivivisection society—his illogicality is typical of their pronouncements. If I misjudge him, and his misreading of Professor Smyth's letter was not deliberate, I offer my apologies. The whole question of the supply of cats and dogs for research is so acute, and of such importance to the future of medicine in this country, that attempts to draw attention from it must not be allowed.—I am, etc.,

London, W.C.1. M. GRACE EGGLETON.

*** This correspondence is now closed.—ED., *B.M.J.*

Reform in Medical Education

SIR,—The article on "Reform in Medical Education" by Professor W. Melville Arnott (September 3, p. 497) is a notable contribution to the literature on this subject. It should prove most useful to those who are responsible for framing curricula in numerous medical schools. Where so much is excellent, one hesitates to criticize, but there appear to me to be three points which call for comment.

(1) If one infers correctly, the author is of the opinion that physical examination of the chest is a clinical method inferior to that of examination by radiography, and that the only purpose of such method is to provide practice "against the time when radiology is not available." Surely, however, there is to be obtained from physical examination of the chest much information which may not be revealed by even the very best

radiograph. Furthermore, there are many points concerning the functional aspects of the thorax about which the radiograph will tell us nothing. Professor Melville Arnott may look upon these points as axiomatic, and possibly the statement in the *Journal* does not represent the full text of his address to the East Yorkshire Branch of the B.M.A.

(2) "Mathematics to a higher standard, including elementary statistical methods and an introduction to the calculus . . . should be an essential requirement for admission to a medical school." There is no doubt that such knowledge is most useful to a medical student, but if the possession of it were made a condition of entry, one feels, from long experience of medical students, that such insistence would preclude the admission of many to the medical faculty.

It might here be mentioned that Professor E. C. Dodds, in his article in the same issue of the *Journal* (p. 505), states, "I have been impressed with the curious allergic objection that they (medical students) have to any form of mathematics," and, further, he says, "It is possible to explain to students the phenomena of physical and colloid chemistry without recourse to higher mathematics." One has noticed over a period of years that not a few students who do very well in mathematics do not do well in other subjects of a biological nature requiring skill in the fundamental disciplines of clinical examination. It was shown in a paper a few years ago that too great insistence on mathematical ability would have deprived a number of Australian hospitals of some first-class clinicians. A paper by D. H. Smyth, quoted in the article, bears out the fact that there is room in the medical profession for men and women possessing very diverse aptitude.

(3) As Professor Melville Arnott says, the selection of students is a most controversial question. Experience over a number of years with the interview, however, convinces one that this procedure has very definite limitations. It has been said very truly that it is only by living with people that one comes to know them well. If all intending medical students who were physically fit were required to undergo a year of national service, with a proportion of time given over to scholastic work as in a Service training college, it would be possible to obtain from their instructors the information that university authorities are seeking.—I am, etc.,

Brisbane. E. S. MEYERS.

Treatment of Ringworm of the Scalp

SIR,—There are certain statements in the letter by Drs. J. Martin Beare and Ivan H. McCaw (October 8, p. 815) which call for further comment. The literature by no means confirms their contention that 25% of *M. audouini* infections of the scalp undergo spontaneous cure in less than six months. In fact there are countless reports, such as that of Lewis[1] and Lewis and Hopper,[2] in which such cases have been treated by local methods for long periods of time without any response whatever. Even in series such as that of Livingood and Pillsbury,[3] in which some 33% of "spontaneous" cures were claimed despite the fact that local treatment was applied the whole time, it took anything up to two years for the cases to become finally clear. It is evident, therefore, that this factor is of little or no importance when evaluating any method of treatment which will cure this condition in an average time of three months or less.

At this point it may be emphasized that the desirability of rendering these cases non-infective as soon as possible precludes the possibility of using untreated cases as controls. While the use of a toothbrush in applying the ointment to the scalp may be regarded as a useful "additional mechanical factor," as Drs. R. T. Brain and H. Haber and Mr. J. W. Hadgraft point out in their paper (September 17, p. 626), it has never been suggested that it is anything more than this, and it is difficult to imagine how it could ever approach in efficiency manual epilation with forceps by a skilled operator as Drs. Beare and McCaw suggest. In any case, except for academic reasons, surely it is quite immaterial whether the toothbrush assists the action of the local application or not. The fact which is of real importance, as the previous paper by Brain and his colleagues[4] and the preliminary communication by Drs. A. J. E. Barlow, F. W. Chattaway, and C. S. Whewell (October 15, p. 875) shows, is that this method of treatment is capable of curing some 75% of cases of *M. audouini* infection in an average time of 8–9 weeks without its being necessary to resort to manual epilation with forceps or any other procedure which cannot be carried out by the parent at home. This last point is, I think, of particular importance.

Although Drs. Beare and McCaw had four cases of contact dermatitis out of 14 cases in which salicylanilide in carbowax was used, they do not state the concentration of the fungicide or whether the preparation contained any other substances which may have caused sensitization. It should also be pointed out that both Schwartz and his colleagues[5] and Kinnear and Rogers[6] treated a considerable number of cases with salicylanilide not exceeding 5%, and no cases of contact dermatitis were reported. Irritation due to mechanical friction should be distinguished from true sensitization dermatitis.

While it was admitted by Brain and his colleagues[4] that *x*-ray epilation still afforded the quickest and most certain method of cure, it should be remembered that at many specialized centres practising this form of therapy there is a wait of sometimes three to four months before treatment can be commenced. Add to this the four or six weeks required for cure and the total time is some three to four months, which is four to eight weeks longer than the time taken to cure 75% by effective local therapy. In almost every case which yields to local treatment a distinct reduction in the number of infected hairs as seen under Wood's light seems to occur within eight weeks, and usually much sooner, thus enabling one to sort out at this stage with a fair degree of certainty those which will probably require *x*-ray epilation. This can then be arranged. It will be seen, therefore, that even the 25% of failures can then be assured of a probable cure in a total time of five to six months.

It might be as well at this point to summarize the main disadvantages of *x*-ray epilation[7]: (1) Permanent alopecia is extremely unlikely in the most expert hands, but always remains a possibility, especially with less expert operators. Shanks[8] instances nine cases in 2,400 epilations. (2) Apparatus and expert radiotherapists are not available everywhere. (3) *X*-rays are unsuitable for very young children and quite often necessitate an anaesthetic with its negligible but nevertheless ever-present risk. (4) Hair is longer regrowing than after local therapy, which is a particular disadvantage in the case of girls.

I would suggest, therefore, that the method of treatment outlined by Brain and his colleagues,[4] while suitable only where facilities exist for examination under Wood's light and, preferably, culture of the organism, should be used in preference to *x*-ray epilation under the following circumstances: (1) in all cases of pre-school age; (2) where facilities for *x*-ray epilation are not available within a very short time, and especially during epidemics; (3) in all cases of infection with the animal microsporon—e.g., *M. felineum* or *M. lanosum*.—I am, etc.,

Witley, Surrey. K. D. CROW.

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4 *British Medical Journal*, 1948, **1**, 723.
5 *J. Amer. med. Ass.*, 1946, **132**, 58.
6 *British Medical Journal*, 1948, **2**, 854.
7 Thomas, B. A., Lennox, M., and Duncan, J. T., ibid., 1945, **2**, 346.
8 Quoted by Ormsby, O. S., and Montgomery, H., *Textbook of Diseases of the Skin*, 1944.

Treatment of Erysipeloid with Penicillin

SIR,—I am prompted by Dr. R. A. Bush's medical memorandum concerning his case of erysipeloid of Rosenbach (October 29, p. 964) to let you know of my experience. During the past year I have seen four cases. The diagnosis was made on clinical grounds; a painful, slowly spreading erythema was present and there was a history of contact with raw meat or fish. In all cases the hand was the site of the lesion, which had been present for roughly one week before medical attention was sought.

As some cases are said to respond to sulphonamides[1] a course of sulphamezathine was started, but it was evident that the area involved was extending, and after three days the drug was stopped and replaced by penicillin intramuscularly. It was

given in doses of 500.000 units in aqueous solution at 24-hour intervals. The patients continued at their work and no local treatment was administered. The response in all cases was dramatic; 24 hours after the first injection the colour was fading. Twenty-four hours after the second iniection the skin appeared normal, but some pain was present on movement. A third injection cleared this, and no further treatment was given.

One of the patients defaulted after the second injection, but the condition resumed activity after two days and the patient attended again. It would appear that in addition to the skin clearing one must be sure that movement is painless before pronouncing the patient cured.—I am, etc.,

Huddersfield. N. V. SAPIER.

REFERENCE

Sequeira, J. H., Ingram, J. T., and Brain, T. R., *Diseases of the Skin*, 1947, London.

Hypnosis in Treatment

SIR,—Dr. K. M. Hay (October 15, p. 874) remains far from being reassured of the possible dangers of hypnosis to the personality. I have tried to allay his fears and suspicions in my last letter (October 1, p. 756) by reporting that in the light of present knowledge no evidence of personality danger exists during hypnosis as demonstrated by the Rorschach test. Dr. Hay dismisses such evidence as invalid because he doubts that the Rorschach test is anything more than a modified ink-blot test and can be nothing more than a rough measure of the personality biased by one psychological school or another.

Agreed that the Rorschach test is as yet an imperfect measure of the personality, yet it remains a universally recognized test of personality and is considered by many as the most efficient of such tests in the psychological armamentarium. It is certainly a more accurate and scientific investigation of the personality than that which might be revealed by any inquiry conducted by general practitioners, religious leaders, and philosophers as was advocated by Dr. Hay in his earlier letter (September 17, p. 653).—I am, etc.,

London, W.14. NEVILLE MURRAY.

*** This correspondence is now closed.—ED., *B.M.J.*

Infantile Enteritis

SIR,—I have read with interest your leading article (July 15, p. 141) on the aetiology of infantile enteritis and the paper in the same issue (p. 117) by Drs. Joan Taylor, B. W. Powell, and Joyce Wright describing an investigation of the aetiology and treatment of this condition. From the statements in the *Journal* it does not appear likely that you have read my papers.[1 2] These investigations I carried out on infantile diarrhoeas occurring in infants in nurseries for the newborn in Ontario. The epidemics, 10 in number, occurred from December, 1940, to September, 1943.

At that time, during the bacteriological investigations of faeces and other specimens obtained from sick infants and fatal cases, I was impressed with the large numbers of *Bact. coli* in these sick infants. Many of these colon organisms showed distinct zones of haemolysis around the colonies on sheep-blood agar plates but failed to show any appreciable haemolytic titre against sheep or rabbit blood cells in the test-tube.

It is quite possible that the toxin liberated by many colon organisms can produce the characteristic symptoms in infants if they are suddenly swamped with large numbers of viable, toxin-producing organisms in their feeds. Histamine may be produced and may be one of the factors causing the severity of the symptoms. I suggest five reasons for suspecting the *Bact. coli* and their ability to produce symptoms in these infants. (1) Abundance of these organisms in sick infants and fatal cases. (2) Production of scours in calves due to colon organisms; Theobald Smith reports that calves which did not receive the colostrum milk were more often attacked. (3) Presence of lysozyme in mothers' milk and not in cows' milk. (4) *Bact. coli* bacteriophage absent in the intestinal tract of the newborn infant. (5) Production of toxins from colon organisms and their ability to produce diarrhoea, vomiting, and even death in cats.

As I have stated, the possibility of a virus has not been excluded. Light and Hodes were able to produce diarrhoea in Guernsey calves from filtrates of the faeces taken from affected infants. I am not aware that this finding has been confirmed by other workers. All these investigations should once again stress the importance of breast-feeding. It was noted in these epidemics that premature infants were the first to become ill and were the first to die. It was not until a normal infant became ill that the epidemic was recognized.

I am now practising in a mission hospital in South China, and here at least 95% of the infants are breast-fed. We do not have these epidemics in the nursery. We do not have feeds of cows' milk lying around to become contaminated with *Bact. coli*. The fermentative reactions which occur in the intestine of the breast-fed infant keep the numbers of colon organisms greatly reduced, until the infant can deal with them and create an immunity against the toxins produced by them, or whatever the process is that enables the infant to accustom itself to them.—I am, etc.,

Kongmoon, South China. WALLACE B. MCCLURE.

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Dosage of Penicillin

SIR,—It seems to me that during the last few years the dosage of penicillin recommended in the treatment of various maladies has steadily risen. When we first received supplies of penicillin for trial we were told that after exhaustive research it had been found that 15.000 units three-hourly or a total of 120,000 units in 24 hours maintained an effective blood level.

In the article by Mr W. M. Mollison entitled "The Acute Ear" (October 22, p. 923) there is recommended a dosage of 500.000 units of watery solution twice daily—i.e., a daily total of 1.000.000 units—this in spite of the fact that the drug is now provided in a much more pure state.

Has this dosage been arrived at by research in a bacteriological laboratory or is it because of a loss of faith in the power of the drug? Is it a result of clinical experience, or is it simply because penicillin is now so much cheaper that it can be wasted? In all humility I ask, Is this dosage really necessary? Or is it just as ridiculous and wasteful as pushing large quantities of vitamins into a patient who is already getting enough from his diet?—I am, etc.,

Witney, Oxon. L. G. LE CLERCQ.

Buccal Ulcers Caused by Isoprenaline

SIR,—We have recently had in the Middlesex Hospital, under the care of Dr. G. E. S. Ward, three patients suffering from asthma who presented an unusual and trivial, but to them distressing and to us inconvenient, complication. They obtained good relief from attacks by sucking a tablet or half a tablet (10–20 mg.) of isoprenaline under the tongue. The first patient complained of "sores" in her mouth which looked like aphthous ulcers and were treated accordingly. She had been discharged before similar lesions occurring in two further patients drew our attention to the possibility that they were caused by isoprenaline. That this was so was readily confirmed. Two brands of isoprenaline ("neo-epinine" and "neodrenal") were tried, and both caused ulceration.

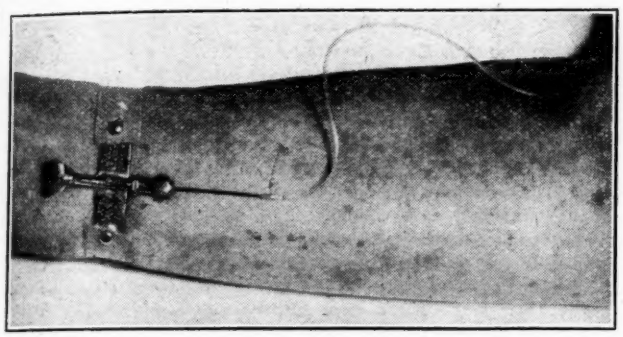
Neither of these patients showed sufficient skill or understanding to obtain comparable relief from hand-operated spray inhalers, so we sought for a way to avoid this unpleasant side-effect. It seemed reasonable to suppose that the buccal mucosa was in some way damaged by prolonged contact with the vasoconstrictor drug when concentrated in a tablet, so we tried powdering the tablet in a small amount of liquid (rather less than half a teaspoonful of lemon syrup was used, but this is only arbitrary) before giving it to the patient to suck. This had the desired effect, and both patients were able to use the tablets satisfactorily with no further trouble.

It is felt that this complication and the simple manœuvre by which it is avoided are worth reporting, because isoprenaline is valuable in the relief of asthmatic attacks, especially so in those patients who are unable to master the (albeit elementary) technique of using and looking after a hand-spray inhaler.—I am, etc.,

London, W.1. MORAN CAMPBELL.

Heparin Administration by Polythene Tubing

SIR,—I was very interested by Dr. W. A. L. MacFadyen's note (October 22, p. 925) on the use of polythene tubing and a diaphragm adaptor for the intravenous administration of heparin. I have for some time been giving heparin by a similar method, but have used the Robertshaw modification of the Gordh adaptor. This adaptor is similar to that described by Dr. MacFadyen but is provided with a wide metal flange which facilitates attachment to the arm. Although this adaptor is supplied with a rubber strap for fixing it to the arm, it is in practice much better to attach it with a length of elastic adhesive strapping as shown in the accompanying photograph.



Robertshaw-Gordh adaptor with 14 s.w.g. needle and fine polythene tubing. After sterile dressings have been applied over the diaphragm and the puncture wound, the whole apparatus is covered with a soft bandage.

A further advantage of this apparatus is that the diaphragm is set at an angle to the needle, which facilitates injection.

This needle adaptor is supplied by A. L. Hawkins and Co., Ltd., 15, New Cavendish Street, London, W.1, and it has been in use in a number of the wards of St. Bartholomew's Hospital. I can certainly vouch for the simplicity of the apparatus, which has completely revolutionized heparin treatment. Whereas the ordinary Gordh needle cannot be used in the antecubital fossa, the polythene tubing can be readily inserted here and pushed up the vein for an inch or two above the elbow (this is often especially useful in those patients who, having no suitable forearm veins, could not previously be treated easily with the ordinary diaphragm needle).

Finally, I would like to emphasize that many patients are up and about throughout the period of treatment, the polythene tube remaining in the same vein for four or five days, and sometimes for as long as 10 days.—I am, etc.,

Radlett, Herts. R. S. MURLEY.

Carbachol for Migraine

SIR,—Ophthalmologists will be grateful that such an authority as Sir John Parsons thought it necessary to comment (October 29, p. 980) on the article by Dr. G. S. Graveson (October 15, p. 838). The majority will agree with his remark that Dr. Graveson's article is liable to misrepresentation and may cause suffering to migraine subjects.

I have been particularly interested in this condition for many years, and I have never found a case of permanent homonymous field defect due to migraine. I do not find that the typical migraine syndrome has the scintillating scotomata as a most frequent sign. I consider the bad headache, sickness, photophobia, and the wish of sufferers to rest in a darkened room are most symptomatic. I am acquainted with the theories of migraine here and abroad, but must say that I have not met many cases of aphasia, tingling, and numbness of fingers and tongue, as described. I have tried to watch the fundal condition in some patients during an attack, and admit my complete inability to see any change in the retinal vessels.

However, my whole ambition in writing this letter is to stress that, whatever theories, syndromes, and ideas we would like to postulate, our great mission as physicians is to bring relief to the unfortunate victims of this or any other condition, and I believe we have a specific for migraine in carbachol. Carbamylcholine chloride is a similar substance to acetylcholine. It is, I believe, resistant to cholinesterase, and is a parasympathetic nervous stimulant and produces peripheral dilatation of the blood vessels. If vascular spasm is the cause, carbachol may counteract it.

Long before the war I used a similar substance, though an inferior one, the German "doryl" (an English preparation was named "moryl"). In an article appearing in this *Journal* in 1945 (May 12, p. 663) Dr. A. K. James gave facts and figures of his treatment of migraine with carbachol. I had prepared a series of cases to report in the *Journal* of my success with "moryl," and I went on to investigate carbachol, and since then I have never failed in curing a migraine attack either temporarily or permanently by the use of this preparation. In fact, I am now so sure of its activity that in bad headaches and conditions simulating migraine where one suspects the history given by a patient I give or advise carbachol, and if there is no immediate improvement I feel the condition has nothing to do with migraine.—I am, etc.,

Walton-on-Thames, Surrey. J. H. MELLOTTE.

New Mechanism of Vitamin Deprivation

SIR,—Under this title Professor A. C. Frazer published an article in your journal (October 1, p. 731). His considerations cover a very wide field—the causes of deficiencies of fat- and water-soluble vitamins, some of which practically have nothing in common but the name vitamin. Several of his statements as well as his main claim to have discovered a new mechanism causing vitamin deficiencies require comment. His conclusions are based on some features of deficiencies of vitamins of the B group—riboflavin, nicotinamide, pyridoxin, and folic acid—as observed in sprue. My comments are as follows.

1. Professor Frazer states that the effect of antibacterial agents on vitamin deficiencies is unknown. This is not so. Considerable reduction of urinary output by man of aneurin[1] and of nicotinamide methochloride[2] has been observed after oral administration of "sterilizing" sulphonamides to humans, some of which were pellagrins. Moreover, cases of nicotinamide deficiencies have been reported after oral application of succinyl sulphathiazole,[3] sulphadiazine, and penicillin.[4]

2. Professor Frazer states that all these vitamins mentioned by him are essential growth factors for bacteria, particularly those which are known to be present in the upper part of the small intestine in sprue. He does not give details of the types found under these conditions. If, however, *Bact. coli*, which are the main producers of nicotinamide in the human intestines under normal conditions, are amongst these bacteria this statement is incorrect, since *Bact. coli* can easily grow without any of these vitamins.[5]

3. Professor Frazer further states that the part played by the intestinal bacteria in vitamin synthesis in human subjects is obscure. It has been shown that the human requirements of aneurin,[1] riboflavin,[6] and nicotinamide[2] are covered to a considerable extent by the production and release of these substances by the intestinal flora. These earlier investigations have been reviewed and discussed on several occasions.[7–10] It has been shown by simultaneous examination of the bacterial composition of the faeces and of the height of urinary nicotinamide methochloride elimination that the latter parallels the amount of *Bact. coli* in the faeces.[11] Of the most frequent inhabitants of the human intestines, *Bact. coli* produces, and *Proteus* and *Staphylococcus faecalis* consume, nicotinamide.[12]

4. The competition of nicotinamide-consuming and producing bacteria and other inhabitants of the intestinal tract as influencing the amount of nicotinamide available from this source for human requirements has been discussed in almost every

paper dealing with this subject. Consumption or production of nicotinamide by a mixed culture from the human caecum depends on the growth under anaerobic or aerobic conditions.[13] The fact stressed by Professor Frazer that in cases of sprue intestinal bacteria were found in the upmost part of the small intestine in a- or hypohydrochloric patients as being important in the development of the deficiency is irrelevant. Viable *Bact. coli* release only very little nicotinamide, while dead *Bact. coli* release this substance to a large extent.[12] In the highest part of the intestines most of the bacteria will be alive, while in the rectum a large proportion of the bacteria are dead, and nicotinamide is readily absorbed from the rectum.[14]—I am, etc.,

London, S.W.1. P. ELLINGER.

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Manufacture of Cortisone

SIR,—After hearing a talk broadcast by the B.B.C. on the use of "compound E" in rheumatoid arthritis, in which the speaker mentioned that the bile from 40 carcasses of cattle was required to produce one daily dose of cortisone, it occurred to me that the present slow rate of production might be accelerated if it were possible to produce, by operation, biliary fistulae in suitable cattle. I can quite imagine that it might present a surgical problem of some magnitude, but, recalling the remarkable feats of surgery performed by physiologists such as Pavlov on animals, I can see no *prima facie* reason why it should not be feasible. Moreover, if cortisone proves to be indeed the answer to rheumatoid arthritis, it might be worth the trouble to arrange for the central collection of the bile that drains from the bile ducts of patients who have undergone choledochotomy, which in aggregate over the entire country must amount to many gallons daily.—I am, etc.,

Bedford. CECIL ALEXANDER.

The G.P. and E.C.T.

SIR,—E.C.T. again! Surely "this is where we came in." I can recall several previous discussions, in all of which I had the pleasure of joining. Dr. Donald M. O'Connor (October 29, p. 984), because of some relapses in his patients, would have us go back to "bromides, barbiturates, and chloral hydrate." Supposing a certain number do relapse, what is wrong with a second course of E.C.T., or even a third? Three courses can be given (average 6–10 treatments) in under three months, and cure in this period compares favourably with 6–18 months of "bromides, barbiturates, and chloral"—not to speak of long periods in the latter treatment when one goes to sleep uneasily wondering whether the patient will stick it out or whether one will get a telephone message from a relative saying he failed to return "from a walk in the country."

As illustrating the value of E.C.T., may I quote my own experience here? Largely as the result of E.C.T., admissions to the hospital of which I am in charge (St. Luke's, Armagh) have quadrupled (approximately 90 per annum to 350) in the past five years. In spite of this our permanent population has risen very little. Had relapses been at all frequent or of serious nature we should have been swamped.

One point I will grant Dr. O'Connor: E.C.T. in out-patient practice is only about 60% as effective as when a patient agrees to enter hospital. This can easily be understood when it is appreciated that instead of continuous rest the patient must make his way home a few hours after treatment and perhaps have to tackle business or domestic problems with a mind showing marked temporary lapses of memory. Nevertheless, if the patient will not or cannot enter hospital it is an essential part of treatment for all anxiety and depressive conditions and should be given forthwith.

The long night of waiting in psychiatric practice is over, and the dawn is here. Psychiatry, with E.C.T., insulin coma, leucotomy, occupational and recreational therapy, suggestion, persuasion, explanation, and understanding, is on the march, and nothing will reverse the process and revive the days of "bromides, barbiturates, and chloral hydrate."—I am, etc.,

Armagh, Northern Ireland. ROBERT THOMPSON.

Health and the Soil

SIR,—In your issue of February 11, 1939, you were good enough to publish an article of mine entitled "Health and the Soil," which I prefaced with the modern danger of an excessive speed of knowledge at the periphery unaccompanied by a strengthening of knowledge at the centre. I supported this thesis with a saying of the great Goethe (who foresaw what we now see) in his *Wahlverwandschaften*: "Every evil shall be healed upon the spot, where it shows itself, and no one concerns himself about the place, where it really takes origin, whence it works its effects. For this reason it is difficult to take counsel."

Reflecting upon this divergency as affecting my own profession, I had for some years collected such notes as I could to restore a balance by concentrating on the central problem—namely, health—as revealed by the healthiest people I could find. Under the guidance of Sir Robert McCarrison I chose the Hunza of the Gilgit, of whom he wrote: "These people are unsurpassed by any Indian race in perfection of physique; they are long-lived, vigorous in youth and age, capable of great endurance, and enjoy a remarkable freedom from disease in general."

I embodied the results of my investigation in a book. Briefly, the conclusion come to in this study was that in devising life nature devised health with it—the health of the soil, the health of the river and sea, the health of the plants, animals and man as one interdependent whole—and that the key to the part that man should play was to preserve this interdependency by the rule of return, under which everything that had life in the soil should after death be restored to the soil as food for further life. This rule the Hunza followed: the dead leaf, the outworn cloth, the excreta, all were collected to form a compost for the soil that nourished further life.

This rule, it was found, was almost entirely neglected by the modern, city-dominated civilization. There were, of course, some who saw the terrible danger of this neglect. But as for official opinion and action, there is now the remarkable National Health Service. Its planning has been carried out with the utmost care and precision, such as evokes admiration and wonderment. So much so is this that its very creators, creatures of the periphery, praise themselves in no mean measure. "It offers a chance—and a challenge—to build the most efficient health service in the world, and one which as the years go by will add steadily to the nation's fitness, happiness and working capacity." I almost quail before my own opinion of this fine boastfulness, but having reached threescore years and ten I cannot recede. It is this—that one doctor at least must make it public that this boast is "sheer bilge" in a scheme which takes no heed of the centre and throughout never mentions the soil.—I am, etc.,

London, S.W.1. G. T. WRENCH.

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1 *The Wheel o Health—A Study of a Very Healthy People*, 1938, London

Sudden Obesity and Psychological Trauma

SIR,—I should like to record my appreciation to Drs. H. J. Shorvon and John S. Richardson for their excellent article (October 29, p. 951) on the above subject. No longer can we rely on the Shakespearean "lean and hungry look" as a steadfast sign of the anxiety state. The syndrome which has been discussed bears some resemblance to the acute exudative attacks of seborrhoeic dermatitis which are frequently psychogenic. It has been suggested by Barber[1] that these may be associated with

an increased secretion of the antidiuretic hormone from the posterior pituitary acting through the hypothalamic nuclei. In these cases there is evidence of cutaneous hydration, and they are favourably influenced by the promotion of diuresis. (As the obesity cases were kept on a full diet, their loss of weight was presumably associated with polyuria.)

In contrast to the severe psychiatric trauma in the authors' cases, acute seborrhoeic dermatitis may follow trivial emotional upsets, such as apparent "loss of face." It is to be remembered in this connexion that in Parkinsonism, where the principal lesions are in the substantia nigra, "seborrhoea" is a usual clinical feature.

It would be of interest to learn if these cases of obesity had an excessive secretion of sebum before treatment. In Case 2 mention is made of "an itching rash on the inside of her legs and pruritus ani."—I am, etc.,

London, W.1. IAN MARTIN-SCOTT.

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1 *Modern Trends in Dermatology*, 1948, London, p. 132.

Definition of Senility

SIR,—Considerable misunderstandings occur on account of the lack of definition of the words "senile" and "senility." This difficulty arises frequently for those in charge of homes for aged people. Some doctors will write a medical certificate saying that the old person suffers from "senility." This may mean that they are old and feeble. It may mean that they are mentally failing, and it may mean a complete break-up both physically and mentally. On the other hand, with the general public the two words are usually used in the sense of mental failure ranging from mild forgetfulness to senile dementia. They are, in fact, very loose terms describing various degrees of ageing, and it will be a matter of great convenience to all concerned if these terms can be more clearly defined.—I am, etc.,

London, N.6. M. N. HILL.

Pause for Refection

SIR,—To see writers on scientific subjects drawing to the full upon the rich treasure of the vocabulary of the English language is never other than a source of satisfaction. But words are in some sense tallies or counters, the legitimate use of which is subject to limitation. I am led to this reflection by the use of the verb "refect" by Professor A. C. Frazer in his paper entitled "A New Mechanism of Vitamin Deprivation" (October 1, p. 731). The *O.E.D.* defines "refect" used as a transitive verb as meaning "to refresh, especially with food or drink" and mentions that it fell out of use before 1700 and was revived in the nineteenth century, but has always been rare and is now somewhat rhetorical. According to this authority the late George Augustus Sala, eminently a rhetorical person, "remembered once refecting himself at a public dinner." But how and when is a rat "refected"?—I am, etc.,

Wolverhampton. S. C. DYKE.

Failed Forceps

SIR,—I read Professor F. J. Browne's article entitled "Failed Forceps" (October 29, p. 975) with great interest. I was, however, surprised and disappointed that he did not mention deep transverse arrest of the foetal head, which in my opinion is the commonest cause of arrest of the foetal head and therefore of failed forceps. It is noteworthy that none of the recent textbooks stresses this condition sufficiently, since new housemen are always surprised at the frequency.

Of our last 100 forceps deliveries, deep transverse arrest was found 40 times and a persistent occipito-posterior position twice only. If a pelvic application of the forceps is made the blades will slip off. Similarly I do not think it is sufficiently stressed in textbooks that the foetal head engages in the transverse diameter in approximately 40% of cases, and that deep transverse arrest is therefore only rarely due to an incompletely rotated occipito-posterior position.

Professor Browne recommends manual rotation by passing the hand into the vagina and the forefinger on to the anterior shoulder without dislodging the head. However, the latter is very liable to happen to a practitioner not well versed in this manœuvre, and he will find himself faced with a high free head to which he cannot or should not apply forceps unless he is able to press the head into the pelvis again. This explains why so many cases of "failed forceps" due to transverse arrest arrive in hospital with a high head, though the practitioner who failed to deliver the baby states that the scalp had been visible at the vulva before the attempt at delivery was made. It is therefore safer in the first instance to perform manual rotation of the head with one hand in the vagina and to rotate the anterior shoulder simultaneously with the outside hand. This almost invariably succeeds.—I am, etc.,

Leicester. W. P. HIRSCH.

The Acute Throat

SIR,—I have appreciated very much the comments made by the various critics of my article on the acute throat (October 15, p. 860). I am sure that it is only one of the functions of a refresher course to supply an up-to-date description of signs, symptoms, and treatment; the other, quite as important, is to make the reader take stock as it were and consider his own practice in the light of someone else's experience. If my forthright utterances have caused readers to ponder upon the value of different forms of treatment the article will have served a useful purpose.

I was of course aware that the sulphonamides were widely regarded as efficacious in tonsillitis. Nevertheless, it is necessary to be clear about what the sulphonamides are expected to do. I imagine I am not exaggerating if I say that of every 100 sore throats which are severe enough to make the patient seek medical advice at least 70 of them will subside, by means of the hosts' natural defences, within a matter of 24–48 hours. I am not satisfied from my own clinical observation that sulphonamides hasten this process. Further, one of my assistants, Dr. J. O. French, conducted a very carefully controlled investigation of the efficacy of sulphonamides in scarlet fever. She was unable to observe any beneficial effect upon the throat or upon the duration of pyrexia in those given sulphonamide compared with a group of patients (alternate cases) not so treated. When an infection shows a spontaneous tendency to rapid cure in a high proportion of cases one must be wary of making unqualified claims for a certain measure of treatment.

In the second place, the clinical diagnosis of streptococcal throat makes a further difficulty. From my own clinical observation, supported by adequate bacteriology, I am far from convinced that I can diagnose streptococcal tonsillitis on sight. In a fair proportion of apparently typical cases the flora obtained on a blood-agar plate is little different from the normal, and streptococci are disappointingly absent. As a rule, however, it is not difficult to recognize the effects of streptococcal invasion, and I feel that sulphonamide should be reserved for such cases. It was for this reason that I stressed the importance of examining glands, middle-ears, and sinuses.

Finally, I would like to plead for thoughtfulness in the use of all the different chemotherapeutic weapons. Coming to terms with the common pathogenic bacteria is, in this imperfect world, an essential part of growing up. The throat is by long experience well equipped to cope with most of the bacteria that meet it. The occasional mild tonsillitis may be no bad thing if, as a result, our immunity mechanisms are stimulated, for we may thereby be the better equipped to deal with later attacks. The unnecessary aborting of mild illness of no danger to the patient just for the saving of a few hours in the total duration of the infection should not too easily be regarded as a good thing. The experience of the clinician in the fever hospital leaves no doubt about the great increase in sensitization rashes. The experience of the clinician and of the pathologist leaves no doubt about the great increase in the occurrence of polyarteritis nodosa. I would be foolish to say that there was an absolute correlation between these facts and the known increase in the ingestion of sulphonamides, for of course there has been an increase in the ingestion of all kinds of chemicals in recent years. But such facts should make us pause before using sulphonamides routinely for trivial illnesses.—I am, etc.,

Glasgow. THOMAS ANDERSON.

POINTS FROM LETTERS

Congenital Pyloric Stenosis

Dr. C. V. PINK (London, S.E.3) writes: In their interesting memorandum Messrs. E. S. R. Hughes, H. A. D. Small, and J. W. F. Macky (October 1, p. 741) state that "the aetiology of congenital pyloric stenosis is quite obscure." So perhaps the following is worthy of notice, since it seems to indicate the direction in which we may have to look to find the cause of it. On return from a few days' holiday my late partner was told of a fully developed case of pyloric stenosis. The baby, 3 weeks old, had lost 12 oz. (340 g.) in three days, and the vomiting was definitely projectile. After interviewing the mother he told me that her attitude to the baby was all wrong and that he thought he had been able to help her put it right. The baby had no more symptoms from the time of interview. The trouble may have been that pregnancy was resented or used for purely personal ends. . . . The presence of a strong psychological factor in pregnancy is at least a possible explanation of the observations you published on the occurrence of pyloric stenosis in twins.

Spoons as a Measure

Dr. J. M. HAMILL (London, W.14) writes: It is generally considered that two tablespoonfuls equal approximately one fluid ounce, and I have a measuring glass on which the markings agree with this. I had, however, the curiosity to test whether the tablespoon markings on the measuring glass did correspond to actual tablespoons, and I found on trying several tablespoons in my possession that each when filled contains one ounce of liquid which when transferred to the measuring glass rose to the two tablespoonfuls mark. In other words my tablespoons measure just twice as much as the tablespoons marked on the glass measure and contain one ounce of liquid instead of the usually presumed half ounce. This has practical importance, because a physician may prescribe a dose of one tablespoon expecting this to be half an ounce, whereas with my tablespoons the patient would be getting one ounce.

Medical Administrators

Dr. JOHN SLEIGH (Saxmundham, Suffolk) writes: Mr. G. H. Colt (October 1, p. 756) regards the use of medical men purely as administrators and superintendents as a waste. He considers that medical men in their prime superintending and inspecting hospitals and planning could be better employed working at medicine or surgery. It cannot be too often repeated that the treatment of illness and disease does nothing to reduce their incidence, and that the fall in the death rate during the last century has been due not to advances in treatment but to advances in environmental hygiene. . . . It is not unreasonable to presume that further improvements in the health of the people will be due in part to the concern of public health service administrators with those broader aspects of environmental hygiene to which most human ailments are due and with which in the past, being partly occupied with hospital administration, they have not had time to deal. As regards the question of the medical superintendents, it is at any rate noteworthy that the Central Consultants and Specialists Committee (Scotland) strongly favours the retention of the medical superintendent (*British Medical Journal Supplement*, 1949, **1**, 270).

Open Sesame

Dr. H. J. HOYTE (Birmingham) writes: Dr. T. Anderson, in his instructive article (October 15, p. 860) entitled "The Acute Throat," refers to the difficulty of examining the throat of an uncooperative child. In my experience this is a real problem in the infant between 1 and 3 years old. Seated comfortably on his mother's lap, he has no objection to being thoroughly inspected—indeed he returns this with interest—but to let a strange man gaze into his interior would be, he feels, an unwarrantable intrusion into his own personal privacy. Yet the examination of the throat is so important, and it is almost equally important not to antagonize him (or her) by the use of force. The following little ruse takes only a few seconds of time and very often succeeds in unlocking the tight little lips. The child is seated on his mother's lap (or that of a nurse) in a good light. After a brief general inspection I turn to the mother and say, "Look, Mrs. ———, I'm going to peep into your mouth and then I want you to give a bit of a laugh." The mother opens her mouth, and I make a show of examining it without actually soiling my spatula; then she gives a laugh or murmurs, "Oh, how nice." If the father is at hand, or an elder brother or sister, I do the same with each of them and finally turn to the child, saying, "Now it's your turn," and in most cases the mouth springs open.

Obituary

Dr. JOSEPH EVERETT LA FRENAIS, of Runcorn, Cheshire, died suddenly on October 2 while on his way for a holiday in Scotland, with which country he had close associations. He was educated at Dollar Academy, and studied medicine at Edinburgh, qualifying in 1930. He was a house-surgeon at Hull Royal Infirmary, and later house-physician at Chester Royal Infirmary, where he first became acquainted with the county in which he finally settled in 1935. He soon became popular as a general practitioner, and was appointed to the visiting staff of Runcorn Hospital and also acted as police surgeon for the area. From the outbreak of the recent war he spent six years in the R.A.F., five of them in the Middle and Far East, including India, Burma, and China. He attained the rank of wing commander before he was invalided out with a disability which was subsequently to cut short his life at the early age of 44. Joseph La Frenais was the ideal type of practitioner. He possessed not only clinical ability of the highest order but a genial personality which with his friendliness and kindness attracted to him patients of all ages. Although a bachelor himself, he was especially fond of his young patients, who instinctively responded to him. In all aspects of his work, in all his endeavours on behalf of his patients, he never spared himself. On leaving the R.A.F. he resumed his practice—in partnership with his brother and later his brother-in-law. While fully aware of the implications of his disability, and of the necessity of having to suffer some restriction of his work, he faced the future with cheerfulness and courage. He was a freemason, a rotarian, and was associated with the Runcorn Squadron of the A.T.C. He always took a close interest in a number of sports, not only as a spectator, but as a player. He was a keen golfer, and at the time of his death was the popular captain of Runcorn Golf Club. His jovial and engaging personality brought him many friends, and, although ever proud of being a Scot, he occupied a prominent place in the town of his adoption. He was especially happy in his home and family life, and to his mother, brother, and sisters the sincere sympathy of his colleagues will be extended. The memory of the sterling qualities of Joseph Le Frenais will long be held not only by his patients and friends in Runcorn but by those of us who worked with him. To one who was his first assistant and enjoyed the hospitality of his home, the memory will be not only of an able clinician and unselfish chief but of a good friend.—E. W. T. E.

Dr. JOHN JOHNSTONE WILSON, of Anstruther, died on October 6 at the age of 82. He was born in Dunkeld, where his father was minister of the parish church, and educated at George Watson's College and Edinburgh University, graduating M.B., C.M. in 1889 and proceeding M.D. in 1894. He was a house-physician at Edinburgh Royal Infirmary with Dr. Affleck in the year following graduation. He came to Anstruther as an assistant in 1890. Despite the claims of an arduous and extensive practice, he found time for reading and study, as is shown by his taking the M.R.C.P.Ed. in 1922, 33 years after graduating. He was elected F.R.C.P.Ed. in 1925. Dr. Wilson was an enthusiastic member of the Fife Medical Association, holding office as president and also contributing several papers on medical subjects. He was an active member of the B.M.A. and was president of the Fife Branch in 1927–8. During his school and 'varsity days he was a noted rugby player. As an assistant he first lived in St. Monans—about four miles away—and walked to Anstruther daily, sometimes walking as much as 16 miles a day in all weathers. A son of the manse, he continued to take a deep interest in church matters and held office as an elder until his death. He was also a freemason and a past master of the local lodge. John Wilson had a long career as a general practitioner, yet he was something more. He showed that it was possible to combine reading and study with the management of a busy practice, and obtained high academic honours by examination at a time when most practising doctors consider they have left such ordeals far behind. He always put service

before self, and he was both doctor and friend to his patients. A man of character and resource, he set himself a very high standard of practice and was an example of the best type of country doctor, loved and respected by all with whom he came into contact. Always attentive to the interests of his patients, he looked upon their faults with a kindly and tolerant humour, giving freely without complaint arduous service to the community and finding in his work his chief reward. He leaves a widow and two sons, one of whom is a consultant physician with the Northern Regional Hospital Board.—A. A. M.

Dr. ROBERT SEVESTRE died at his home in Leicester on October 13 at the age of 81. Some months ago it was necessary for him to undergo an operation, from which he recovered sufficiently to enable him to get about again. Born in Calcutta, of Huguenot stock, he was brought to England in childhood, and was educated at Rugby, Trinity College, Cambridge, and St. Bartholomew's Hospital. He qualified in 1893, graduated M.B., B.Ch. a year later, and proceeded M.D. in 1896. Some two years later he was appointed honorary assistant physician to Leicester Royal Infirmary. Later he became honorary physician, and then, at the age of 60, he was elected honorary consulting physician. During the first world war he served in France in the R.A.M.C. with the rank of major, and was attached to a general hospital. Returning to this country, he was posted to the 5th Northern General Hospital, Leicester, where he met his wife, who was then on the nursing staff. He was the joint author of the section on "Wounds of the Chest" in the *Manual of War Surgery*. Mrs. Sevestre died in 1937, and their only son, a subaltern in the K.O.S.B., was killed in an accident in the Far East in 1943. Dr. Sevestre was appointed a justice of the peace for Leicester in 1929. He was a governor of the Wyggeston Hospital, chairman of the Pensions Committee, a trustee of Simons Charity, and an officer of the Order of St. John of Jerusalem. He was president of the Midland Branch of the B.M.A. in 1922–3, and represented his constituency at Annual Representative Meetings in 1904–6. He was also a member of the Leicester Medical Society. Dr. Sevestre was of a quiet and retiring disposition, but became widely known and highly thought of in the city to which he devoted a full life of medical service. A link with a previous generation of physicians has been severed at his passing. His work at the infirmary, to which he unselfishly devoted himself for so long a period, earned for him the gratitude of countless thousands of patients.—R. McD. C.

Dr. LIONEL DUDLEY WOODS died on October 23 at his home in the Isle of Man at the age of 63. He qualified in Dublin in 1907, finishing his course at the Meath Hospital, and he became house-surgeon at Noble's Hospital. He then entered general practice in the same district in which his father in an Irish jaunting car was so familiar a figure. In August, 1914, Dr. Woods went to Netley, and subsequently he served with distinction in Salonika. He was mentioned in dispatches twice and was awarded the O.B.E., the Serbian Order of St. Sava, and the Croix de Chevalier d'Honneur. A many-sided personality, Dr. Woods was a traditional family doctor, beloved by his patients and valued for his understanding of human nature. Soon after his return from the Army he was appointed honorary surgeon and radiologist to Noble's Hospital. In the earlier inter-war years he was most active in surgery, and especially noted for his management of difficult fractures. Later when rheumatism crippled his fingers he devoted himself more and more to radiology, and the present highly developed radiological and physiotherapy department at Noble's Hospital bears testimony to his constant endeavour to keep his department up to date. Dr. Woods was chairman of the War Pensions Board and of the medical division of recruiting. An active member of the B.M.A., he was president of the Isle of Man Branch in 1933–4. In 1926 he was made an officer of the Order of St. John of Jerusalem, and the present flourishing state of the brigade in the island is in great part due to his efforts. He ultimately became county surgeon. In the recent war he was medical officer to the first battalion of the Home Guard, and as the war progressed more work devolved on him. It was the strain of these years which took such a heavy toll of his strength and hastened his untimely death, a loss which his colleagues in the island feel acutely.—C. G. P.

Dr. FRANK GOWER BERGIN died at his home in Clifton Bristol, on October 25, at the age of 70. A native of County Cork, Dr. Bergin qualified at Bristol in 1905. He was a house-physician and later a house-surgeon at the Bristol General Hospital before starting in practice in Clifton in 1908. From the earliest days he was interested in radiology, and in 1916 he joined the R.A.M.C. as a radiological specialist. He was serving on board H.M.S. *Britannic*, which was used as a hospital ship, when she was torpedoed and sunk off Malta. After his demobilization in 1919 he was appointed honorary radiologist to the Bristol General Hospital, and continued in this capacity until 1939, when, following the amalgamation of the Bristol hospitals, he was appointed director of the radiological department. In the very early days he possessed the only *x*-ray plant in the West Country, and often made long trips by ambulance with his portable apparatus in order to assist hospitals which had not at that time obtained *x*-ray equipment. Apart from his specialist practice, Dr. Bergin was for 37 years responsible for the medical care of the children and staff of Muller's Orphanage. At different times his father and his elder brother had served the same institution. He only relinquished this work last year on account of failing health. Dr. Bergin was for a number of years consultant radiologist to Clifton College, to the British Overseas Airways Corporation, and to Southmead Hospital, and he was a lecturer at Bristol University. He was also associated with the Bristol Dispensary, the Homoeopathic Hospital, and the Central Clinic. Dr. Bergin was a keen amateur photographer and gardener, and he always took the greatest interest in his many young friends, and particularly his own grandchildren. A deeply religious man, he was associated for over 40 years with the Clifton Bethesda. The sympathy of his colleagues, his former patients, and his many friends will be extended to his widow and his two sons, who are both members of the profession.

Dr. JOSEPH CORBETT MUIR, who was for many years medical superintendent of Whipps Cross Hospital, died suddenly on October 29 at his home in Gloucestershire. Dr. Muir studied at Cambridge and at Manchester, graduating M.B., B.Ch. in 1897, and proceeding M.D. in 1901. After holding resident appointments at the Manchester Royal Infirmary and at the Pendlebury Children's Hospital, he joined the staff of Plaistow Fever Hospital, working under the late Dr. Biernacki. In 1908 he was appointed medical superintendent of Whipps Cross Hospital, where he was to remain until 1932, except for a period from 1915–19 when as a captain in the R.A.M.C. he saw active service in Flanders and was for some time a prisoner of war in Germany. Whipps Cross Hospital had been open only for some five years when Dr. Muir joined the staff, and it may be said that its development into a busy, modern, and well-equipped general hospital is largely due to the advice which he tendered to the former West Ham board of guardians. A man of strong personality, he greatly improved the conditions of the patients and staff. He was a strict disciplinarian, but nevertheless he was very attentive in dealing with any problems concerning members of the hospital staff, many of whom will recall the help that he gave them. Dr. Muir was regarded by his professional colleagues as a practitioner of outstanding merit, and members of the consulting staff always valued his opinion on a difficult case. As a hospital administrator he was known throughout the country, and for a period held office as president of the Medical Superintendents' Society. Ill-health caused him to retire in 1932, and he had since been living at Box, in Gloucestershire. He closely identified himself with the life of the district and was a member of the Stroud Rural District Council. Although he was confined to his home, and was unable to visit the hospital for which he had done so much, nevertheless he was delighted to receive news of its progress and much appreciated visits from members of the staff if they happened to be in the neighbourhood. Although many of those who worked with Dr. Muir have left the hospital, there are still some who have personal recollections of his work.

while his reputation is known to all who profit by the standards which he set in the past. A keen sportsman, Dr. Muir was an accomplished tennis player and golfer. He played tennis for Essex and Gloucestershire, and he had a very low golf handicap. He was equally enthusiastic about rugby, and followed the fortunes of the Stroud Club. Dr. Muir is survived by his widow, to whom the sympathy of his colleagues and friends will be extended.—A. N. S.

Medico-Legal

INSANITY IN THE CRIMINAL LAW OF MALTA

BY

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The plea of insanity raised by the defence in the recent Haigh trial (*Journal*, July 30, p. 286) demonstrated once again the difference between the medical and the legal view regarding the criminal responsibility of mentally disordered persons. This paper attempts to describe in brief how Maltese legislation deals with the question of the culpability of the insane offender and to outline the procedure followed by a Maltese court of law. It is suggested that similar legal provisions could be substituted in England for the present unsatisfactory tests of legal responsibility and methods of assessing the mental state of the accused.

A commission of five Maltese legal men was set up in 1831 to compile a criminal code and a code of criminal procedure for the Island of Malta and its Dependencies. The commissioners were instructed to base their work on the report drawn up in 1826 by a distinguished English judge, Sir J. Richardson, and upon the principles of the best foreign codes. The Neapolitan Code, promulgated in 1819 in the Kingdom of the Two Sicilies and based on the reformed French Code, was adopted as a model. In 1836 the first draft code of penal laws to be drawn up under British rule was published. After several revisions and a lengthy discussion in the Council of Government, the draft code was finally promulgated in 1854. Article 32 of this code stated that "no person is liable to punishment for an act done or omitted by him when he is of unsound mind or in a state of madness." Other articles dealt with the procedure to be adopted when the plea of insanity was raised and with the disposal of the insane criminal. Important amendments and additions to the original code were introduced in 1900, 1909, 1914, and 1935.

Present Provisions

The plea of insanity may be raised either during the inquiry (Court of Judicial Police as a Court of Criminal Instruction) or during the trial (H.M. Criminal Court).

During the Inquiry.—Article 34, para. *(a)*, of the Criminal Code lays down that no one is liable to punishment if at the time of the act or omission complained of such person was insane. When, therefore, there are reasonable grounds for suspecting that the alleged offender was insane at the time of the commission or omission of the act, or at the time of the instruction, the court appoints one or more mental experts to examine the accused and report upon his state of mind. If they report that the accused was mentally ill at the time of the alleged offence, the court orders the transmission of the records of the inquiry to the Attorney-General. If the latter does not decide to contest the findings of the experts, the court decrees that the person in question be sent to the mental hospital, and it informs the Head of the Government of this step. The Head of the Government then issues such directions as he deems necessary for the care and custody of the insane person. The accused has the right of appeal against the court's decision. If the Attorney-General opposes the experts' opinion, he may direct the court to continue with the inquiry on the merits of the charge, or he may refer the matter to H.M. Criminal Court, where the issue of insanity is decided by a jury.

During the Trial.—In conformity with Article 34, it has been held that no one can be called to answer to a charge if at the time of the trial he is insane. Should the defence wish to raise the plea that the accused is insane at the time of the trial, it must do so during the preliminary proceedings following the reading of the indictment and before the answer of the accused party as to his being guilty or not. If the plea of insanity is raised by the defence after the preliminary stage, then it is dealt with together with the other pleas on the merits. The question of insanity at the time of the offence or at the time of the trial may also be raised by the court. In such a case, if the medical experts come to the conclusion that the accused was insane, and both the defence and the prosecution do not contest the experts' findings, then the court dispenses with further proceedings and orders the removal of the accused to the mental hospital.

Insanity at the time of the offence cannot be alleged after the jury has given its verdict, but, whenever the necessity arises from any fact or circumstance of fact expressly found by the jury, the plea of insanity, both at the time of the crime and during the trial, may be brought forward even after the jury's verdict on the alleged offence, provided that this plea is made before the delivery of the sentence of the court. The decision whether a person is insane or not is determined by the jury by a majority of votes. Following a verdict of insanity, the accused party is ordered by the court to be detained in the mental hospital. The board of the mental hospital is empowered to recommend the discharge of a criminal patient to His Excellency the Governor if the patient recovers or if he no longer requires further detention.

Medical Experts

Only the court has the right to appoint and to choose the medical experts. They are usually of an uneven number and they are given a specified time (which may be extended if necessary) within which to submit their report. They are given every facility to study the mental condition of the accused party. Thus, once the plea of insanity has been raised, the court orders the accused to be sent to the mental hospital "under observation for mental disorder." Here the psychiatrists will have every opportunity to study the accused man or woman. The experts swear to perform their duties faithfully and honestly. It has been recommended by the court that, whenever in the course of their inquiries the experts obtain information, the persons giving such information should be heard as witnesses and their information recorded in the form of statements. It has also been recommended that a regular *procès-verbal* of the interrogatory of the patient, when made by the experts, should be kept and filed with the report. The report of the psychiatrists is read publicly and they may be submitted to cross-examination under oath. Those persons who have given information to the experts are also examined like any other witness.

The court may allow the mental experts to obtain on oath all relevant information about the accused from witnesses residing outside its jurisdiction. It has been held "that it is the court's duty to see that every provision be made so that the experts may have at their disposal all such information as may enable them to give, in the interests of justice, a correct opinion." The court, the prosecution, the defence, and members of the jury have the right to ask for further elucidation from the experts on their report or on such other points as they may deem necessary in order to make the opinion of the experts clearer. The members of the jury are not bound to abide by the conclusions of the mental experts against their own conviction.

Comment

The superiority of Maltese law over English law on the subject of the culpability of the insane is obvious. In Malta there are no tests of legal responsibility in the case of mentally disordered persons arraigned before a court of law. Maltese legislators have not laid down any rules by which the distinction between sanity and insanity is to be drawn. They are aware that this demarcation line is a delicate one, and they leave it to the mental experts to decide when a man ceases to exercise control over his actions on account of mental illness. Maltese jurisprudence has likewise recognized the fact that, apart from psychosis and mental defect, such disorders of the personality as "adolescent instability" and "psychopathic

personality" may exonerate the accused from culpability. In Malta, therefore, it is enough for the psychiatrists to show that an accused person is mentally ill to exempt him from punishment. Of course the jury may not accept the psychiatrists' diagnosis of insanity, and they are free to judge the accused party to be sane in spite of the psychiatrists' opinion to the contrary. But the illogical situation of finding a person insane and at the same time legally responsible for his acts can never occur in a Maltese court of law.

Another advantage of Maltese procedure is in the calling of mental experts to assess the state of mind of the accused. The appointment of mental experts to examine the accused pertains to the court alone. It has been held that it is not only the right but also the duty of the judicial authority to ascertain the state of mind of the accused both at the time of commission or omission of the act complained of and at the time of the trial. To deny such a right to the judicial authority is to ignore one of the fundamental principles of criminal justice and to run the risk of convicting a non-responsible person.

The divergence of opinion that often arises in an English court of law about whether the accused is insane within the meaning of the law tends to create confusion in the minds of the jury. There may also be a tendency for the jury to look upon the mental experts of either the defence or the prosecution as biased or interested parties. Maltese legal provisions with regard to the choice of the mental experts cannot give rise to such perplexity in the minds of the jury. The psychiatrists are appointed by the court, and this ensures their absolute independence of both the defence and the prosecution. They are as independent as the judge himself. They are above any possible suspicion of bias either in favour of or against the accused, and, what is equally important, the public feels that justice is not only being done but is "manifestly and undoubtedly seen to be done."

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Medical Notes in Parliament

NURSES BILL

The Nurses Bill was considered on report in the House of Commons on November 4. The committee stage was taken on October 28 (*Journal*, November 12, p. 1120).

Mr. BLENKINSOP moved and Mr. WALTER ELLIOT supported a new clause to impose penalties on persons who falsely represented themselves as being included in the list of nurses kept under Section 18 of the 1943 Act. The clause was added to the Bill.

Mr. HOWARD moved a new clause providing for the appointment of a training committee and setting out its powers. He pointed out that Parliament was setting up within the General Nursing Council one statutory committee to deal with finance and another to deal with mental nursing, but there was no statutory committee to consider improvements in the training of nurses. Mr. LINSTEAD, in seconding, said the General Nursing Council was ceasing to be an independent professional body and in half its activities was becoming a paying agent of the Treasury. Once it was partially integrated into the Government machine it was in danger of losing authority and independence.

Mr. BLENKINSOP said the control of training was the main function of the General Nursing Council, and it was clear that it would set up a committee, as it had done in the past, to look after this feature of its work. The Government had already gone as far as it ought in statutorily subdividing the General Nursing Council. Mr. SOMERVILLE HASTINGS believed that the clause would be undesirable. The object of the Bill was to separate the training of nurses from the administration of hospitals. Mr. HOWARD then withdrew the amendment.

Nurse-training Committees

On Clause 2 Mr. BLENKINSOP moved an amendment substituting "Area Nurse Training Committees" for "Standing Nurse Training Committees." This and other small amendments were approved.

On Clause 4 Mr. DIAMOND moved an amendment to ensure that the General Nursing Council should not be required to consider an estimate unless that estimate related to a hospital which had already been approved by the Council for the purpose of nurse training. Mr. BLENKINSOP said it was true that Clause 4 did not specifically refer to training which was in accordance with the Council's training rules, but Clause 6 clearly provided that the Council should defray all expenses which had been incurred by an Area Nurse Training Committee with the approval of the Council. It would be within the power of the Council to decline to approve any expenditure on training not in accordance with its rules.

Mr. LINSTEAD was perturbed at the suggestion that no finance would be forthcoming for nurse training except in respect of institutions already approved. That seemed to him to crystallize and sterilize everything. He hoped the Minister would say a few words on how experimental training schemes, while they were being built up to the stage justifying approval, were to be financed. Mr. BLENKINSOP said the Bill left the General Nursing Council full discretion to deal with expenditure in the building up of training schools to the required standard.

Mr. WALTER ELLIOT said the grading up of hospitals and the standards of teaching institutions had been points around which arguments had gone on for years, particularly in regard to the grading up of local government institutions to the point of becoming teaching institutions. An institution anxious to reach the standard might believe it could do so, but the General Nursing Council might think it could not. In those circumstances a promising development might be stultified. There were many cases where advocates for a hospital becoming a training school had great difficulty in persuading the powers that be that the hospital was fit to be recognized for training.

Mr. HASTINGS received an assurance from Mr. BLENKINSOP that if a regional hospital board decided to build a 200-bed hospital and to have a nurse-training school requiring a certain amount of building and equipment, the regional hospital board could apply for finances for this purpose. Mr. DIAMOND then withdrew his amendment.

Mr. HOWARD moved an amendment to make it clear that the Minister should not specify what type of equipment or activity was desirable for the purpose of training nurses. He said it was for the professional body to specify and for the Minister to approve. Mr. LINSTEAD seconded this amendment.

Mr. BLENKINSOP suggested that the amendment would give to the General Nursing Council a responsibility for splitting up general expenditure which should not be the responsibility of that Council and must be the responsibility of the Minister. The amendment was negatived, and small amendments were accepted on Clauses 5, 6, and 7.

On Clause 8 Mr. BLENKINSOP moved an amendment authorizing the nomination to the finance committee by the Minister of not more than two persons other than members of the Council, after consultation with the Council. He said the Government felt that such appointments would be valuable to both sides. The House accepted the amendment.

Mr. BLENKINSOP further moved as an amendment to the First Schedule that some of the first members appointed to the Council should hold office for a term of three years. He said this would provide more overlapping of the periods of office of the different members of the Council. Minor amendments were made in the Second Schedule and the report stage ended.

Third Reading

The third reading followed immediately. Mr. BLENKINSOP said the House was anxious to give every encouragement to the General Nursing Council because of the value to the Health Service which would come from the further improvements in nurse training which the Bill would effect.

Sir HUGH LUCAS-TOOTH said the Opposition had apprehensions that difficulties would arise in the working of the Bill. He feared the Government had over-simplified the position, perhaps because they had in mind what had been done in the training of doctors. Ministers were disposed to think that it would be possible to set up some kindred organization which would work as easily and as quickly. The organization connected with the medical schools had grown up over a very long time and it would be difficult to introduce a similar organization quickly for training nurses. He feared there would be a number of errors before the country secured a satisfactory system.

Colonel LIPTON said both teaching hospitals and municipal hospitals, as they used to be called, would gain from the co-ordination that was likely to be brought about by the Bill. He welcomed the assurance given earlier by Mr. Blenkinsop that the General Nursing Council was not likely to make demands upon the teaching hospitals which would diminish their high standards. He hoped that neither regional boards nor hospital governors would deter any ward sister or any others in the lower ranks of the nursing profession from endeavouring to get elected to the General Nursing Council.

The Bill was then read a third time without a division.

National Federation of Hospital Officers

Sir JOHN MELLOR on October 25 drew attention to the refusal of the Minister of Health to negotiate with the National Federation of Hospital Officers. He said the Federation had been formed and registered as a trade union in 1948. Its constitution prescribed that only administrative, clerical, professional, and technical workers in hospital should be eligible for membership and that its activities were to be limited to the interests of hospitals services and hospitals officers. It further provided that these activities should be strictly non-political. At present in the administrative and clerical field the Federation had approximately 3,500 members out of its total membership of about 6,500. In July, 1948, the Federation wrote to the secretary of the staff side of the administrative and clerical functional council under the Whitley scheme in the National Health Service applying for seats on the functional council. That application was not approved.

The Federation then appealed to the Minister and asked him to grant it the right to negotiate directly with him if it was not given seats on the functional council. The Minister's attitude was that the composition of the staff side was a matter for the staff side itself. Later the Minister wrote that he would not be warranted in entering into separate discussions with the Federation on matters within the scope of the Whitley Council. The Minister had in fact created a closed shop with no mandate from anyone in the Service except the members of certain bodies which he had invited to form a staff side. Sir John said the National Federation had a larger membership than any other body which had a seat on the Whitley Council. There were about 40,000 hospital officers in the administrative and clerical categories, and the bodies which had been established on the staff side represented only about 8,000 out of this number.

Mr. BURDEN asked Mr. Bevan not to accede to the request of Sir John Mellor. An overwhelming majority of the hospital staffs were already members of existing trade unions. These unions and professional organizations had acted as negotiating bodies before the National Health Service Act, 1946, was passed. The National Federation of Hospital Officers did not exist when the Minister invited the staff side organizations to agree to the setting up of the new functional councils. In accordance with Whitley practice another organization could obtain admission to the Whitley Council only with the consent of the existing staff side. Mr. Bevan would depart from normal procedure if he adopted any other practice. The sponsors of the Federation were chief administrative officers of certain ex-voluntary hospitals, most of whom were known to be opponents of trade union organizations in their hospitals before the introduction of the National Health Service. Propaganda material had been issued from the offices of the British Hospitals Association, the recognized association of voluntary hospitals.

Sir JOHN MELLOR said these men were not opposed to trade unionism but were opposed to political trade unionism, and the constitution of the Federation reflected that opposition.

Mr. HAYDN DAVIES said Sir John Mellor had not rendered a service to the hospital administration by raising this matter. His endeavour was to make things more difficult for those who had to administer the teaching hospitals. It was sheer snobbery for persons to say that they could not be represented on the staff side of the Whitley Council through their trade union. Before the mushroom growth of the Federation there had been appropriate trade unions which could have taken in all the professional men.

Dr. H. B. MORGAN said that the union of which he as a medical man was a member, the Confederation of Health Service Employees, had more officers as members than had the Federation. The Federation had been formed from a source which had had opportunities in previous years to get representation on bodies connected with hospital matters and had suddenly realized after the passing of the National Health Service Act that the voluntary hospitals were part of the national health system. The Federation was a new union of doubtful strength. He doubted whether it would last long. Many trade unions still had no representation. Some were too small and some were not sectionalized enough. The health section of the Transport and General Workers Union was definitely sectionalized and discussed only its own problems. The Federation should wait its turn and ask for representation when the Act had consolidated itself. He thought that Sir John Mellor did not know the difficulties which had been encountered in consolidating the status of doctors and of nurses in the Service and of adjusting one side to another. Those behind the scenes were doing their best to get a smooth passage for the Act, which would take at least five years to come to full fruition.

Mr. BLENKINSOP, replying to the debate, regretted that this discussion would make the position on the Whitley Council more difficult. If it were to be suggested that the Minister as employer should have a right to settle the form of staff side representation, that would have a most disastrous effect on the health services. It would be difficult for the Whitley machinery to work smoothly if separate negotiations were going on with another body. The Ministry had not closed the door to future direct negotiations should it be satisfied that by denying them a large proportion of the workers in this field would be ruled out of representation. The Ministry did not feel that a membership of 3,000 out of some 22,000 workers was sufficient to warrant its interference with the Whitley Council and the danger of breaking the Whitley Council arrangements by opening direct negotiations. He accepted that membership of the Federation was growing and said that the Ministry would have to review the matter later. Before the Ministry opened negotiations it must also be satisfied that the Federation was becoming established as a permanent body. It had only been in existence for a short time.

Second Opinions by R.M.O.s

Mr. DOUGLAS HOUGHTON on November 1 asked the Minister of National Insurance what decisions were reached by regional medical officers in the 202,188 cases referred to them for a second medical opinion in the twelve months ended September 30, 1949, and in the 75,189 referred to them in the previous twelve months.

Mr. JAMES GRIFFITHS, in reply, circulated the following table with the particulars asked for expressed as percentages:

	Cases submitted to Regional Medical Officer	
	Year ended September 30, 1949	*Year ended September 30, 1948*
Accepted as incapable without examination after consultation with claimant's doctor, or found incapable of work on examination	48	41
Incapable of normal occupation but not incapable of alternative work	4	5
Not incapable of work	16	13
Failed to attend examination or submitted evidence of recovery before examination	32	41

Mr. Griffiths added that the reports of regional medical officers did not constitute decisions on claims for benefit but were evidence which, along with the certificates rendered by the claimant's own doctor, would be taken into account by the statutory authorities in determining the claim.

No Names

Colonel ALAN DOWER on November 1 asked the Chancellor of the Exchequer to make known the names of the members of the Exchange Control Medical Advisory Committee who decided whether to approve or disapprove applications for urgent medical treatment abroad.

Mr. GLENVIL HALL replied that this could not be done. Sir Stafford Cripps had already said it would not be advisable to disclose the names of the members of the committee.

Morphine for Mountaineers

Mr. EDE, replying on November 3 to Squadron Leader FLEMING, said that, in consultation with the Minister of Health, he was considering whether it would be possible to make arrangements, subject to suitable safeguards, for the administration of morphine to injured climbers. He could not approve the arrangements which the Manchester surgeon, Mr. Wilson Hey (*Journal*, November 5, p. 1056), had operated since 1934 for mountain rescue squads to carry ampoules of morphine for the speedy treatment of injured climbers. He said he could not wink at defiance of the law for 15 years, but if Mr. Wilson Hey submitted another plan for the carrying of this drug he would consider it.

Size of N.H.S. Lists

Mr. PLATTS-MILLS asked on November 3 for a list showing the numbers of general practitioners with 2,500, 3,000, 3,500, 4,000, and over 4,000 patients registered with them under the National Health scheme.

Mr. BEVAN said general statistics were not readily available, but inquiries had been made in a number of areas. Analysis of the information supplied by six areas, not necessarily typical of the whole country, showed that the following numbers and percentages of doctors on the medical lists of those areas fell into the different categories referred to by Mr. Platts Mills. In compiling the statistics doctors engaged in partnership had been assumed each to be responsible for the average of the number of persons on each partner's list. Doctors employing assistants had had their lists notionally reduced by 2,400 for each assistant. The number of doctors practising under the National Health Service in the six areas concerned was 2,429.

Size of List	Number of Doctors	Percentage of Total Number of Doctors
2,501 to 3,000	323	13·3%
3,001 to 3,500	277	11·4%
3,501 to 4,000	234	9·6%
Over 4,000	160	6·6%

Mr. Bevan added that as there was some element of inflation in executive council's registers, the figures in columns 2 and 3 might be higher than was actually the case. Executive councils were asked in November, 1948, to request doctors with lists in excess of 4,000 not to accept additional persons for inclusion in their lists, except relatives of persons already on their lists living in the same house, until their lists had been brought within the permitted limit. Executive councils generally acted on this request. Some had gone further and used their discretion to require doctors to take further steps to see that their lists were brought within the limit.

Convalescence and Holidays

Mr. PLATTS-MILLS pointed out on November 10 that when a child was sent away for convalescence by a hospital the cost was borne by the regional hospital board and there was no charge to the parents. But if the child was sent away by the local health authority for a recuperative holiday a standard charge was levied on the parents.

Mr. BEVAN replied that convalescence proper was part of the hospital service and was free. Facilities for holidays were one of the "extras" which local authorities could provide as a form of aftercare and for which they could make reasonable charges. He saw no reason to alter this.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

In Congregation on October 29 the following medical degrees were conferred:

M.D.—F. W. Watkyn-Thomas (by proxy), H Harris, B. G. Parsons-Smith, W. S. Haynes, R. V. Stone, C. C. Bryson, M. S. M. Palmer.

UNIVERSITY OF BIRMINGHAM

Professor George Haswell Wilson, M.D., resigned from the Chair of Pathology on September 30. He was elected Professor of Pathology in the University in 1922.

Professor S. Zuckerman, M.D., F.R.S., Director of the Department of Anatomy, has been appointed a member of the Agricultural Research Council.

Professor W. Melville Arnott, M.D., F.R.C.P.Ed., and Professor Zuckerman have been appointed to the University Research Committee as representatives of the Faculty of Medicine for the Session 1949–50.

Walter Thomas Smith, M.B., Ch.B., has been appointed Lecturer in Pathology and G. Cumming, B.Sc., Research Fellow in Medicine from October 1; and R. H. Cawley, B.Sc., Research Fellow in Medical Statistics from August 1.

Degree Day, 1950, will be held on Saturday, July 1, when there will be Congregations in the morning and in the afternoon.

The University Medical Officer's Department will in future be known as the University Health Service.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

The following were admitted to the Membership of the College on November 4: W. G. Keane, D. J. O'Callaghan, I. B. Patwari, O. P. D. Ryan.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The following lectures will be delivered at the College (Lincoln's Inn Fields, London, W.C.): Tuesday, November 22, 3.45 p.m., Imperial Cancer Research Fund Lecture by Dr. James Craigie, "A Quantitative Approach to the Study of Transplantable Tumours"; Thursday, November 24, 5 p.m., Thomas Vicary Lecture by Sir Henry Wade, "The Barber Surgeons of Edinburgh"; Tuesday, November 29, 3.45 p.m., Imperial Cancer Research Fund Lecture by Dr. C. H. Andrewes, F.R.S., "The Virus Theory of Cancer in the Light of Recent Work"; Thursday, December 1, 5 p.m., Otolaryngology Lecture by Professor Geoffrey Jefferson, F.R.S.; "Intracranial Abscess"; Thursday, December 8, 3.45 p.m., Arnott Demonstration by Mr. R. J. Last, "The Knee Joint"; Tuesday, December 20, 3.45 p.m., Arnott Demonstration by Mr. Last, "The Larynx."

The lectures are open to those attending courses at the College and to all other medical practitioners, dental surgeons, and advanced students.

At a meeting of the Council of the College held on November 10, with Sir Cecil Wakeley, President, in the chair, Professor G. Grey Turner was re-elected as the representative of the College on the Council of King's College, Newcastle-upon-Tyne.

Diplomas of Membership were granted to the 173 successful candidates for the licence of the Royal College of Physicians of London (*Journal*, November 12, p. 1122).

Diplomas in Tropical Medicine and Hygiene were granted jointly with the Royal College of Physicians of London to T. H. Work and in Ophthalmic Medicine and Surgery to J. H. Owen-Flood.

St. Woolos Hospital, Newport, Mon., was recognized in respect of the six months' resident surgical appointment required of candidates for the Final Fellowship examination.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

In connexion with the 350th anniversary of the foundation of the Faculty Mr. Archibald L. Goodall, Honorary Librarian, will deliver the Finlayson Memorial Lecture entitled "The Royal Faculty of Physicians and Surgeons" in the Hall of the Faculty, 242, St. Vincent Street, Glasgow, on Wednesday, November 23, at 5 p.m. The lecture is open to the public.

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended October 29. [No. 43

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1949 (a)	(b)	(c)	(d)	(e)	1948 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	26	2	7	—	2	22	2	18	1	—
Deaths		1	—				—	—		
Diphtheria	101	11	33	4	4	129	24	53	7	1
Deaths	—	—	—	—	—	2	—	—	—	—
Dysentery	139	13	55	—	—	68	7	63	1	3
Deaths				—	—				—	—
Encephalitis lethargica, acute	1	—	—	—	1	2	—	1	—	—
Deaths		—					—			
Erysipelas			15	11	5			44	8	4
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				55					61	
Deaths	31	—	7	6	—	32	1	9	4	—
Measles*	995	63	27	129	45	6,211	119	47	127	65
Deaths†			—	—	—			—	—	—
Ophthalmia neonatorum	39	4	7	—	—	45	5	12	1	—
Deaths										
Paratyphoid fever	14	1	1 (B)	2 (B)	—	7	2	—	1 (B)	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	303	18	—	4	4	418	22	4	3	1
Deaths (from influenza)‡	11	2	3	—	—	11	1	1	—	1
Pneumonia, primary			133	10				153	19	
Deaths	136	15		7	7	155	19		4	11
Polio-encephalitis, acute	20	2				4	1			
Deaths										
Poliomyelitis, acute	347	53	5	5	4	66	9	3	3	1
Deaths§	21	2				4	—			
Puerperal fever		—	6				—	9		—
Deaths										
Puerperal pyrexia‖	72	4	6	—	—	107	10	6	—	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,972	169	224	99	159	1,374	82	320	169	49
Deaths†			—	—	—			—	—	1
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	7	—	—	2	—	10	—	1	1	—
Deaths	—	—	—	—	—	2	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	749	31	45	50	39	2,060	127	75	66	16
Deaths	2	—	—	—	—	2	—	—	—	—
Deaths (0–1 year)	233	30	38	23	6	259	30	43	13	13
Deaths (excluding stillbirths)	4,466	710	577	157	118	4,491	723	547	166	118
Annual death rate (per 1,000 persons living)			11·6	9·7				11·0	10·4	
Live births	6,699	1051	820	376	177	7,419	1184	870	406	226
Annual rate per 1,000 persons living			16·4	23·3				17·6	25·4	
Stillbirths	150	20	29			176	27	36		
Rate per 1,000 total births (including stillborn)			34					40		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

Notifications in England and Wales in the week ended November 5 were: poliomyelitis 318 (347), polio-encephalitis 12 (20). Figures for the previous week are shown in parentheses.

Multiple cases were reported in the following counties: London 50 (55), Bedford 6 (2), Berks 7 (3), Buckingham 2 (4), Chester 16 (10), Derby 3 (2), Devon 3 (3), Dorset 7 (3), Durham 3 (2), Essex 24 (26), Gloucester 6 (9), Hereford 4 (2), Hertford 4 (9), Huntingdon 5 (0), Kent 15 (16), Lancaster 26 (32), Leicester 12 (3), Lincoln, Lindsey 5 (13), Middlesex 14 (17), Norfolk 7 (5), Northampton 4 (1), Northumberland 4 (2), Nottingham 9 (8), Oxford 2 (2), Salop 2 (0), Somerset 2 (11), Southampton 9 (13), Stafford 7 (3), East Suffolk 2 (2), Surrey 6 (14), East Sussex 5 (9), Warwick 7 (8), Westmorland 3 (1), Wiltshire 2 (1), North Yorks 2 (2), West Yorks 36 (50), Glamorgan 4 (7).

Smallpox

In Liverpool a male laboratory assistant aged 16, who handled glassware contaminated with smallpox virus modified by egg passage, has developed smallpox. The onset of his illness was on October 24, the rash appearing on October 27. Primary vaccination had been performed on October 17, soon after he started work in the laboratory. The diagnosis has been confirmed by the isolation of smallpox virus from the pustules: the rash is discrete and modified. The patient was isolated on October 29, and contacts have been vaccinated and placed under surveillance.

On November 10 the patient's younger brother, aged 15, living at the same address in Liverpool and unvaccinated at the time of contact, was put under observation with symptoms of early smallpox. His illness is relatively mild.

There is a possibility that the original case may have infected others during the pre-eruptive stage, but all contacts are believed to be under close surveillance, and spread to the general public is not expected.

Typhoid Fever in Salford

There has been a considerable outbreak of typhoid fever in the Salford district. Preliminary inquiries disclosed that all the early cases had taken a meal at the Masonic Hall, Salford, on October 6. Subsequently other cases were found to have had meals at the same place on other dates, and it became apparent that a continuing source of infection had been present. It is thought that some 3,000 persons are at risk.

Up to the present the total of confirmed and suspected cases is 34. The organism is of Vi-phage type E1. Inquiries are being made among the food-handlers at the restaurant. Three are at present under suspicion, and one is excreting organisms of Vi-phage type E1 and is probably a chronic carrier. All food-handlers at the restaurant have been taken off duty temporarily.

Discussion of Table

In *England and Wales* there were decreases in the notifications of whooping-cough 85, measles 57, and acute poliomyelitis 38. The only increase of any size was in the incidence of scarlet fever 63.

Small variations were noted in the incidence of scarlet fever the largest being an increase of 31 in Lancashire. For the fifth successive week there was a rise in the notifications of diphtheria; the chief feature of the returns was an increase of 7 in Lancashire.

The fall in the notifications of measles was due to the experience of the Midlands; in the south and north the incidence increased. In the combined area of London, south-eastern, and south-western counties a rise of 81 was recorded, and in the north-western and northern counties there was a rise of 70. The largest local changes in the notifications of measles were decreases in the Isle of Ely 55 and in Warwickshire 37, with rises in Norfolk 52 and Lancashire 35.

A further 89 cases of dysentery were notified in the Lancashire outbreaks: Liverpool C.B. 29, Wigan C.B. 16, Ince in Makerfield U.D. 15, and Hindley U.D. 11. The largest returns for food-poisoning were from Yorkshire West Riding, Sheffield C.B. with 37 notifications, and from Warwickshire, Rugby M.B. 24.

In *Scotland* there were small decreases in the notifications of most infectious diseases; the largest fall was scarlet fever 27. The largest returns for dysentery were Glasgow 37 and Dundee 12.

In *Eire* decreases were reported in the incidence of diarrhoea and enteritis 39 and scarlet fever 36. The experience of Dublin C.B. mainly contributed to these falls. Notifications of measles in Waterford C.B. increased by 57, while a fall was recorded in the remainder of the country.

In *Northern Ireland* there were only small fluctuations in the notifications of infectious diseases. A decrease of 12 in the notifications of measles was recorded in Belfast C.B., while an increase of 13 was reported from County Down.

Week Ending November 5

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 2,048, whooping-cough 998, diphtheria 86, measles 1,082, acute pneumonia 419, cerebro-spinal fever 18, acute poliomyelitis 318, acute polio-encephalitis 12, dysentery 83, paratyphoid fever 7, typhoid fever 11, food-poisoning 94.

Medical News

The Vicary Lecture

Sir Henry Wade, C.M.G., D.S.O., F.R.C.S.Ed., will deliver the Thomas Vicary Lecture before the Royal College of Surgeons of England (Lincoln's Inn Fields, London, W.C.) on Thursday, November 24, at 5 p.m. His subject is "The Barber Surgeons of Edinburgh."

Visits to Canada

It is hoped that any medical men and women who intend to visit Canada will inform the Secretary of the B.M.A. so that information of such visits may be forwarded to the Canadian Medical Association, which is anxious to be of help to doctors from the United Kingdom visiting Canada.

Interpreters for the Deaf

The Secretary of State for Scotland has asked local authorities to provide, if possible, the services of a qualified interpreter for the deaf when a deaf or a deaf and dumb person is being medically examined for certification as mentally deficient. This step has been taken as a result of representations made by the Scottish Association for the Deaf.

Christmas Seals

The National Association for the Prevention of Tuberculosis again offers Christmas seals and cards for sale. The profits help to pay for the association's valuable work in educating the public in the prevention of the disease and for the welfare of the tuberculous. The seals have been given by the Canadian Tuberculosis Association and cost 4s. a hundred. The cards are 6d. each, including envelope. Both can be obtained from the Duchess of Portland, chairman of the N.A.P.T., Tavistock House North, Tavistock Square, London, W.C.1, or in Scotland from the N.A.P.T. (Scottish Branch), 65, Castle Street, Edinburgh, 2.

World Research in Alcoholism

The Department of Public Welfare of the State of Illinois publishes monthly an annotated bibliography entitled *World Research in Alcoholism*. This contains abstracts of papers and books on all aspects of the subject of alcoholism and descriptions of the arrangements made by various States to treat and rehabilitate alcoholics. Those wishing to receive copies of *World Research in Alcoholism* should write to the editor, Illinois Department of Public Welfare, Division of the Alienist, 912, South Wood Street, Chicago, 12, Illinois.

British Plastic Surgeon in Turkey

Professor T. Pomfret Kilner, Nuffield Professor of Plastic Surgery in the University of Oxford, left London by air on November 13 for a lecture tour in Turkey organized by the British Council in conjunction with the Turkish Ministry of Health. He will speak in the Universities of Ankara and Istanbul and at hospitals in Ankara and Izmir.

Scholarships for Nurses

The British Commonwealth and Empire Nurses War Memorial Fund will award the following scholarships in 1950: *United Kingdom.*—Royal College of Physicians Scholarship, Sir James Knott Scholarship (limited to a nurse or midwife from Northumberland or Durham), Robert Wood Johnson Scholarship (limited to an English nurse training in child welfare. Countries visited, preferably Canada or Australia). *Dominions.*—Pakistan: Gilchrist Scholarship. Canada: Thomas Wall Scholarship. Ceylon: Mountbatten Scholarship. *Colonies.*—Malaya: Mountbatten Scholarship. Hong Kong: Royal College of Physicians Scholarship (candidates must be colonial nurses). These scholarships will be tenable in a country other than that in which the candidate is domiciled. Nurses and midwives in the U.K. can obtain particulars of the qualifications required from the scholarships secretary of the fund at Dorset House, Stanford Street, London, S.E.1. The entrance form must be completed before January 31, 1950. Selected candidates will then be required to write an essay on "What contribution has nursing made, and can nursing make, to the life of your country?" On the results of this essay a short list will be interviewed for final choice. Candidates from the Dominions and Colonies will be selected by the appropriate authorities there.

Scientific Films

A film on "Tracing the Spread of Infection: Pemphigus Neonatorum," made for the Ministry of Health by the Central Office of Information, was shown at the C.O.I. on November 11. Intended mainly for teaching pupil midwives, it illustrates how the infection may spread from any of the contacts of the infant, and the laboratory methods used in tracing it. The photography and commentary are clear, though in view of the purpose of the film it is questionable whether it should have included such detailed illustration of the laboratory work required in carrying out the coagulase test and phage-typing. It was made with the advice of the Medical Research Council Cross-Infection in Hospital Wards Subcommittee and the Central Midwives Board. Copies of the film (35 mm. and 16 mm.) may be borrowed after November 30 from the Central Film Library, Imperial Institute, London, S.W.7, by those with their own sound projectors. It will also be available on C.O.I. mobile units, for which application should be made to the appropriate regional film officer. His address can be obtained from the C.O.I. at Norgeby House, 83, Baker Street, London, W.1. In either case its use is free of charge.

The London Optical Practitioners Branch of the Association of Scientific Workers showed some scientific films at Friends House, London, on November 10, one of particular interest being a Russian film, with a commentary by Professor J. B. S. Haldane, F.R.S., on blood transfusion experiments in animals. It showed an isolated dog's head supplied with oxygenated blood from a special pump. The head responded to a number of external stimuli; the eyes reacted to light by blinking, and in response to noises the head pricked up its ears. Sometimes the tongue licked round the lips. The film then showed blood being completely drained from an anaesthetized dog, and after ten minutes the blood was pumped back. In due course the dog revived, the pump was detached, and the wound stitched up. On recovery from the anaesthetic the dog seemed none the worse.

Association of Industrial Medical Officers

Dr. L. G. Norman, Chief Medical Officer of the London Transport Executive, has been elected President of the Association of Industrial Medical Officers.

COMING EVENTS

Birmingham Consultants' Meeting

A meeting of the Regional Consultants and Specialists Committee will be held at the Queen Elizabeth Hospital, Birmingham, on November 23, at 5.15 p.m. Subjects to be discussed include reconstitution of the committee and election of representatives.

Cantor Lectures

Mr. D. W. Kent-Jones, Ph.D., will deliver three Cantor Lectures before the Royal Society of Arts (John Adam Street, Adelphi, London, W.C.) on Mondays, November 21 and 28 and December 5, at 6 p.m. His subject is "Bread."

Contraceptive Technique

A lecture and demonstration (on living models) of contraceptive technique will be given by Dr. Marie C. Stopes and Dr. M. Beddow Bayly at the Mothers' Clinic, 108, Whitfield Street, London, W., on Thursday, December 1, at 2.30 p.m. Tickets of admission must be obtained in advance.

SOCIETIES AND LECTURES

Friday

BRITISH INSTITUTE OF RADIOLOGY.—At 32, Welbeck Street, London, W., November 18, 5 p.m., meeting of medical members.

Monday

HUNTERIAN SOCIETY.—At Society of Apothecaries of London, Blackfriars Lane, Queen Victoria Street, E.C., November 21, 8.30 p.m., discussion, "*That Alcohol has Contributed More to the Happiness than to the Misery of Mankind*," proposed by Dr John Y Dent and Dr. Desmond Curran and opposed by Dr. Henry Yellowlees and Mr. Archibald Crawford, K.C.

LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., November 21, 6 p.m., "*The Contribution of Surgery to Preventive Medicine*," Heath Clark Lecture by Sir James Learmonth.

ROYAL SOCIETY OF ARTS, John Adam Street, Adelphi, London, W.C.—November 21, 6 p.m., "*Bread*," Cantor Lecture by Mr. D. W. Kent-Jones, Ph.D.

UNIVERSITY COLLEGE, Gower Street, London, W.C.—November 21, 4.45 p.m., "*Bacterial Toxins*," by Dr W. E. Van Heyningen.

Tuesday

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE.—At University New Buildings (Anatomy Lecture Theatre), Edinburgh, November 22, 5 p.m., "*Pancreatitis*," by Dr. Thomas C Hunt

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, Leicester Square, London, W.C.—November 22, 5 p.m., "*Histopathology of the Skin*," by Dr. I. Muende.

INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—At Postgraduate Medical School of London, Ducane Road, W., November 22, 3 p.m., "*Radiotherapy in Non-malignant Uterine Haemorrhage*," by Dr. Mary D Gilmour.

LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., November 22, 6 p.m., "*The Contribution of Surgery to Preventive Medicine*," Heath Clarke Lecture by Sir James Learmonth.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, London, S.W.—November 22, 5 p.m., "*Development and Behaviour in Childhood*," Charles West Lecture by Dr. N. B. Capon.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—November 22, 3.45 p.m., "*A Quantitative Approach to the Study of Transplantable Tumours*," Imperial Cancer Research Fund Lecture by Dr. James Craigie.

Wednesday

INSTITUTE OF PHYSICS: LONDON AND HOME COUNTIES BRANCH.—At Royal Institution, 21, Albemarle Street, London, W., November 23, 5 p.m., "*Physics of Atmospheric Pollution*," by Dr. A. R. Meetham. Joint meeting with Royal Meteorological Society.

INSTITUTE OF PSYCHIATRY (UNIVERSITY OF LONDON), Maudsley Hospital, Denmark Hill, London S.E.—November 23, 4.30 p.m., lecture-demonstration for postgraduates by Dr E. Stengel.

LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., November 23, 6 p.m., "*The Contribution of Surgery to Preventive Medicine*," Heath Clark Lecture by Sir James Learmonth.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow.—November 23, 5 p.m., "*The Royal Faculty of Physicians and Surgeons*," Finlayson Memorial Lecture by Mr. Archibald L. Goodall.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, London, W.—November 23, 3.30 p.m., "*Mechanization in its Relation to the Public Health*," by Dr. W. Blood.

SOCIAL PSYCHOTHERAPY CENTRE, 7, Fellows Road, London, N.W.—November 23, 5 p.m., "*E.C.T. and Short Methods in Relation to Psychotherapy*," by Dr. A. Joyce Martin.

SOCIETY OF CHEMICAL INDUSTRY: FOOD GROUP.—At Medical Society of London, 11, Chandos Street, Cavendish Square, London, W., November 23, 6.15 p.m., meeting of Microbiological Panel "*Recent Work on the Bacteriology of Pasteurization*," by Messrs. E. B. Anderson and L. J. Meanwell.

Thursday

BRISTOL UNIVERSITY.—At Canynge Hall, Bristol, November 24, 5.15 p.m., "*Disorders of Speech*," by Dr. Macdonald Critchley.

EDINBURGH CLINICAL CLUB.—At B.M.A. Rooms, 7, Drumsheugh Gardens, Edinburgh November 24, 8 p.m., "*Emergencies in Cardiac Practice*," by Dr I. G. W. Hill.

HONYMAN GILLESPIE LECTURE.—At Anatomy Theatre, University New Buildings, Teviot Place, Edinburgh, November 24, 5 p.m., "*Pleurisy*," by Dr. James Laurie.

KING'S COLLEGE OF HOUSEHOLD AND SOCIAL SCIENCE, Campden Hill Road, London, W.—November 24 5.30 p.m., "*Food and Mankind*," by Professor John Yudkin.

LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., November 24, 6 p.m., "*The Contribution of Surgery to Preventive Medicine*," Heath Clark Lecture by Sir James Learmonth.

MEDICO-LEGAL SOCIETY.—At 26, Portland Place, London, W., November 24, 8.15 p.m., "*Psychiatry and the Defence*," by Dr W. L. Neustatter

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—November 24 5 p.m., "*The Barber Surgeons of Edinburgh*," Thomas Vicary Lecture by Sir Henry Wade

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, London, S.W.—November 24, 4.30 p.m., lecture-demonstration: "*Psychiatry*," by Dr. D. Curran.

TORQUAY AND DISTRICT MEDICAL SOCIETY.—At Torbay Hospital, November 24, 8.30 p.m., "*Headache*," by Dr. Anthony Feiling

Friday

KENT AND CANTERBURY HOSPITAL, Canterbury.—November 25, 5 p.m., clinical meeting.

MAIDA VALE HOSPITAL FOR NERVOUS DISEASES MEDICAL SCHOOL, Maida Vale, London, W.—November 25, 5 p.m., clinical demonstration by Dr. P. H. Sandifer.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, London, W.—November 25, 8 p.m., general meeting. "*The Ocular Aspects of the Venereal Diseases*," by Professor A. Sorsby.

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh.—November 25, 8 p.m., "*The Aetiology of Neoplasia*," by Mr. A. H Duncan.

UNIVERSITY COLLEGE, Gower Street, London, W.C.—November 25, 5.15 p.m., "*Transmission of Excitation in Nerve and Muscle*," by Dr. Bernhard Katz.

APPOINTMENTS

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—*House-physician (Junior Registrar grade)*, J. A. Davies, M.B., B.S. *House-surgeon (Junior Registrar grade)*, A. J. Alldred, M.B., Ch.B. *Resident Anaesthetic Registrar (Registrar Grade)*, Elizabeth P Champion, M.B., B.S. *Junior Resident Anaesthetic Registrars*, Margaret E. Browne, M.B., Ch.B. Phyllis M. de Saram, M.B., B.S. *Part-time Orthopaedic Registrar (Senior Grade)*, G. R. Parry, M.B., B.S. *Registrar to Ear, Nose, and Throat Department (Senior Registrar Grade)*, B. H. Pickhard, M.B. B.S., D.L.O.

KALRA, ATAM P., M.B., B.S., D.P.H., D.C.H., Medical Officer of Health to Braintree, Witham, and Dunmow, and Assistant County Medical Officer of Health, Essex.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Brueton.—On November 7, 1949, at Southmead Hospital, Bristol, to Nancy (née Baldwin), M.B., Ch.B., wife of Neville Brueton, M.B., Ch.B., a daughter.

Nicholson.—On November 8, 1949, at Lynfield, The Downs, Altrincham, to Rosabelle and Frank Nicholson, a daughter.

Robertson.—On November 11, 1949, at the Radcliffe Infirmary, Oxford, to Ruth (née Colyer), wife of Dr. D. N. Struan Robertson, a daughter.

MARRIAGES

Blythe—Skidmore.—On September 10, 1949, at Tettenhall Church, Wolverhampton, Frank Blythe, of Woodthorpe, Nottingham, to Clarice A. Skidmore, M.B., B.S., of Tettenhall.

DEATHS

Cooper.—On October 31, 1949, at The Ark, South Bersted, Bognor Regis, Sussex, Ludford Cooper, M.D., late of Devonshire Place, London, W., and formerly of Rochester, aged 82.

Fairweather.—On November 7, 1949, at Purdown House, Stapleton, Bristol, David Stanley Fairweather, M.D., D.P.M., aged 48.

Godfrey.—On November 5, 1949, at Appleton House, Hinckley, Leics, Harry Munn Godfrey, M.D., aged 57.

Godson.—On November 13, 1949, at 28, Town Walls, Shrewsbury, Leonard Joseph Godson, M.R.C.S., L.R.C.P., aged 80.

Harding.—On November 13, 1949, Robert Dennis Harding, D.M., M.R.C.P., D.T.M.&H., of Stonerush, Wootton Courtenay, Minehead, Somerset.

Macfarlane.—On November 8, 1949, in a nursing-home, Aylmer Alexander Macfarlane, M.D., of 4, Gwydyr Mansions, Hove, Sussex.

Macleod.—On November 10, 1949, at Glenavon, Bradford-on-Avon, George Ernest Macleod, L.R.C.P.&S.Ed., L.R.F.P.S., Surgeon Commander, R.N., Ret.

Prior.—On November 6, 1949, at Bournemouth, John Ralph Prior, M.D., D.P.H., aged 75.

Swayne.—On November 10, 1949, Francis Griffiths Swayne, M.B., B.Ch., of Pen-y-Plock, Tillington, Hereford, aged 85.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Immunization Against Colds

Q.—*Is there any method of immunization which will protect an individual against recurrent catarrhal colds during the winter?*

A.—It is now generally accepted that the common cold, and probably similar catarrhal infections of the upper respiratory tract, are due to viruses which have not yet been specifically identified. Protection against the primary virus infection is therefore not to be expected by the use of bacterial vaccines unless the vaccine in some way increases non-specific resistance to the common cold. It seems likely, however, that secondary bacterial infection is a common complication of the primary coryza, probably as a result of the damage to the respiratory mucosa. The bacteria concerned are mostly those already present in the throat, particularly pneumococci, *Haemophilus influenzae*, haemolytic streptococci, and probably some strains of *Neisseria catarrhalis*. Stock vaccines containing these organisms have for many years been used for the prophylaxis of catarrhal infections, and, although control trials have failed to show any significant benefit, many practitioners believe from their personal experience that these anticatarrhal vaccines have some value. Autogenous vaccines made from the pathogenic bacteria present during the later stages of a cold are also used, and these may be preferred, particularly when there is evidence of persisting sinus infection due to a specific organism. Some catarrhal infections may have an associated allergic factor, and here again the vaccine may act as a desensitizing agent. Avoidance of fatigue, damp footwear, and rapid changes of temperature probably helps to maintain resistance against these catarrhal infections.

Chronic Urticaria

Q.—*How should one investigate a case of chronic urticaria? What are the possible methods of treatment?*

A.—The most important items in the investigation of chronic urticaria are a very detailed history and a full physical examination, bearing in mind that the following are the main aetiological factors: foci of infection, foods, drugs, and psychological disturbances. Less often endocrine disturbances, parasites such as worms, and other skin lesions such as scabies and epidermophytosis are the cause; more rarely contact allergens and physical agents (cold, heat, light), and very rarely inhalant allergens. Radiological and laboratory investigations are usually necessary in the search for infection, which must be thorough. Skin tests are of little value, and in inexperienced hands may be misleading. Cooke (*Allergy in Theory and Practice*, London, 1947, p. 306) summarizes the allergist's viewpoint excellently when he writes: "Thirty-five per cent are due to infection, usually focal, 10% are caused by foods, and another 10% by drugs. This leaves nearly half of our cases aetiologically undiagnosed."

Foci of infection should be removed and, where this is impossible, vaccine therapy given. Drug allergy should always be suspected, and it is wise to stop all drugs, apart from antihistamines, for two to three weeks. "Headache powders," purgatives, and the occasional sleeping-tablet must be specially inquired for and stopped. Food allergy may be suspected from the history, but often can be properly investigated only by dietary trial. The foods commonly found responsible are those the patient usually eats—that is, egg, milk, wheat, potato, fish, chocolate, and fruit; and the writer has had a few successes by stopping all tinned foods. Suspected foods should be eliminated, one or two at a time, for two or three weeks, and during this period all traces of these foods must be avoided—for example, egg is contained in cakes, mayonnaise and sauces of all types, meringues and various pastries, etc. Each food or drug tested by elimination must then be added in the quantities usually taken and the effect during the following two to three days observed.

Psychological disturbances play an important part in many of these cases, and the help of a psychiatrist is often required. A lead might be obtained from a history of previous or accompanying psychological symptoms, such as palpitations, insomnia, headache, or vague dyspepsia; and especially so if a history of emotional stress preceding or accompanying the urticaria was obtained. "Sodium amytal" is useful in these cases. Urticaria at the menopause often benefits from stilboestrol. For suspected insect bites the liberal application of D.D.T. powder next to the skin, during the night and in the daytime, should be tried for four to five days: a few cases, especially if of the papular type, are dramatically eased.

The best symptomatic treatment is obtained with the antihistamine drugs. The large majority of cases can be controlled with suitable dosage; drowsiness during the day should be avoided and this side-effect taken advantage of during the night. They can safely be used for long periods. Non-specific treatments with peptone, histamine, vitamin K, calcium, and autohaemotherapy are of little value; they have been given up by many workers in this field. Sometimes, however, when such treatment is being tried one can by careful observation find the underlying cause which has previously been missed.

Quinine in Late Pregnancy

Q.—*The use of quinine to induce labour is now generally deprecated, but some years ago there were numerous reports claiming that in small divided doses (1½ gr. (0.1 g.) t.d.s.) during the last few weeks of pregnancy quinine tended to shorten the duration of labour and lessen the intensity of the pains. Is this so? Is there any evidence that in this dosage it causes any harm to mother or child?*

A.—Although the administration of small doses of quinine for a few days before labour had been previously recommended, D. A. Mitchell, acting on the suggestion of Philip Jones, seems to have been the first to advocate its routine use during the last three weeks of pregnancy (*British Medical Journal*, 1930, **1**, 144). He as well as other writers claimed that it improved general well-being, made labour shorter and easier, ensured good uterine retraction, decreased the need for forceps delivery, and reduced the risk of puerperal sepsis. These and similar claims appear, however, to have been always based on clinical impressions rather than on controlled observations, and there is no definite evidence to support them. The fact that quinine has lost popularity rather suggests that other observers have not been convinced of its efficacy, but it is still used occasionally in cases in which poor uterine action is anticipated. It is never possible to judge its value, but in such dosage it is unlikely to have an adverse effect on the foetus.

Detection of Porphyria

Q.—*What is the simplest and surest way to detect porphyrin in urine, stools, and blood serum?*

A.—There is no simple way of detecting porphyrin in any body fluids. The importance of porphyrin in diagnosis can be exaggerated, and in practice there are two conditions only in which its presence may be of importance: these are acute porphyria and severe chronic lead-poisoning. The easiest techniques were described last year in a letter to the *Journal* (1948, **2**, 659). As the presence of porphyrin in stools is physiological, there is very rarely any need to look for it. In a few cases of porphyria, but not in all, porphyrin can be detected in the serum because it fluoresces red under the black ultra-violet light. In practice, the diagnosis of porphyria is rendered almost certain by a positive response to the Watson and Schwartz test. The other methods necessitate the use of a well-equipped laboratory. In small laboratories the porphyrin may conveniently be concentrated in a barium sulphate precipitate obtained by adding barium chloride to the urine and then eluting it with

ammonia, but this is not a suitable procedure when access to a well-equipped laboratory is not available.

The best account of the subject yet written is the classical monograph by Waldenström, published in *Acta Medica Scandinavica*, 1937, Supplement, **82**. An inquirer with a laboratory would also find the following references useful: Watson, C. J., *J. clin. Invest.*, 1934, **14**, 106; 1935, **14**, 116; 1937, **16**, 383. Waldenström, J., *Acta med. scand.*, 1934, **83**, 281; *Dtsch. Arch. klin. Med.*, 1935, **178**, 38. Roth, E., *Z. klin. Med.*, 1935, **129**, 123. Dobriner, K., *J. biol. Chem.*, 1936, **113**, 1. Turner, W. J., *Arch. intern. Med.*, 1938, **61**, 762. Vahlquist, B., *Hoppe-Seyl. Z.*, 1939, **259**, 213. Rimington, C., *Biochem. J.*, 1943. **37**, 443. Petrie, E., *British Medical Journal*, 1948, **1**, 926.

Dicoumarol in Disseminated Sclerosis

Q.—*Would there be any justification for using dicoumarol in a case of disseminated sclerosis?*

A.—Dicoumarol has been employed to treat disseminated sclerosis because it was suggested that the pathological basis of the disease was a tendency to spontaneous clotting in the blood vessels of the nervous system. This hypothesis has not been generally accepted, and many remain unconvinced that dicoumarol is of any value; moreover, it is not free from risk.

Irregularity at the Menarche

Q.—*Is any treatment required for irregular menstruation in young girls? A healthy girl of 14 started menstruating 18 months ago. The cycle was at first six to seven days every four to eight weeks. Latterly, however, the monthly pattern seems to be lost. She may lose continuously for two or three weeks, then be clear for a week or ten days, then start again. Her general health seems unaffected, and there is no sign of anaemia and no pain. She leads an active life. Is treatment indicated? Can her mother be assured that the girl will grow out of it?*

A.—Menstrual irregularity of this and other types is common at this age, but shows a strong tendency to natural cure within months, or one or two years at the most. If the bleeding is not so heavy as to produce constitutional upset or to interfere with ordinary activities, there may be no need for any special treatment. Thyroid 1 gr. (65 mg.) daily for two or three months often seems to stabilize the cycle in these cases, and calcium might also help. The bleeding is probably anovular in type, but may be a manifestation of either hypo-oestrinism or hyper-oestrinism. If sex-hormone therapy becomes necessary, either of these two possibilities would therefore be covered by giving ethinyl oestradiol, 0.05 mg. twice daily by mouth, administration starting on the second or third day of menstruation and continuing for 20 days. During the last seven days of this treatment ethisterone, 10 mg. three times a day sublingually, should be given as well. The next period is likely to start a few days after the completion of this treatment, and, when it does, repeat the course, giving it three times in all.

Femoral Thrombectomy

Q.—*Is femoral thrombectomy ever undertaken in this country? What are the indications and the possible dangers, and what results have been obtained in any published series of cases?*

A.—Femoral thrombectomy is undertaken in this country, but is not yet established as a regular procedure, many surgeons being content to rely upon Leriche's procedure of procaine block of the lumbar ganglia and the combined administration of heparin and dicoumarol. In certain conditions—for example, after prostatectomy, hysterectomy, haemorrhagic lung infarcts, etc.—one fears to use the anticoagulants in the fullest doses; in these cases ligation of the femoral veins is strongly indicated, and if a clot is encountered at the level of the ligature it must be completely removed above the ligature or it will propagate upwards and manufacture emboli. The removal is done from the iliac veins with forceps such as those designed by Trendelenburg for pulmonary thrombectomy, coupled with a sucker tube with an expanded end. Confirmation that the whole clot has been removed is supplied by the finding in the fragments extracted of the characteristic cap at the end of the clot.

Placental Implants for Rheumatoid Arthritis

Q.—*During a recent visit to Pistány, Czechoslovakia, I was given the opportunity of seeing the operation of placental grafting for rheumatoid arthritis and allied conditions. Is this operation performed in England? If so, what results have been obtained?*

A.—This procedure, which is an empirical one, is not performed in England. The underlying idea is that certain of the hormones which are elaborated in the placenta during pregnancy are of value in the treatment of rheumatoid arthritis. By implanting placental tissue it is hoped that the action of these hormones may be prolonged beyond what might be hoped of injection therapy.

"Rheumatoid Rectal Neuralgia"

Q.—*Is there such a thing as rheumatoid rectal neuralgia? This diagnosis was made recently in a case in which there were no physical signs and the only symptom was rectal pain. I have been unable to find any reference to it in the textbooks.*

A.—There appears to be no scientific justification for the diagnosis of "rheumatoid rectal neuralgia" as an explanation for symptomless rectal pain. The writer has recently heard of this diagnosis being made by a proctologist, but on inquiring the grounds for this opinion he discovered that the word "rheumatic" (or "rheumatoid") was being employed in the mediaeval sense—that is, as a synonym for "painful."

NOTES AND COMMENTS

Jelly-fish and Weever-fish.—Dr. H. S. RUSSELL (Bradford) writes: The answer to the request for advice in treating jelly-fish and weever-fish stings ("Any Questions?" October 1, p. 767) appears to me to be somewhat incomplete. On a recent holiday in Suffolk my small son, aged 11, trod on some stinging fish while coming ashore from a bathe, presumably a lesser weever-fish being responsible. When seen 5 minutes afterwards there was a definite puncture mark seen above the left little toe, with an urticarial weal—radius ½ in. (1.25 cm.)—around it. Intense pain was complained of. A small amount of "anthisan" cream happened to be available and was rubbed into the affected part, which ended the incident completely in about two minutes without any sequelae. May I add that I saw an experienced nurse last night who had a wasp sting while visiting. A little anthisan cream rubbed in at once stopped the pain, though it did not prevent the "lump" from developing. I think these anti-histamine chemicals applied locally in good time save a great deal of trouble to all concerned.

Corrections

The address from which information may be obtained about the Commonwealth Fund fellowships offered by the Commonwealth Fund of New York (November 5, p. 1060) is 35, Portman Square, London, W.1, not Portland Square as printed.

Dr. MAX REISS (Bristol) writes: I would be glad if you would correct a misquotation in the issue of November 5 (p. 1041), in the report of the meeting of the Section of Physical Medicine of the Royal Society of Medicine. The report states: "Dr Max Reiss said that he and Hempel were probably the first to use corticotropic hormone in the treatment of rheumatoid arthritis. . . ." This should read: "Dr. Max Reiss said that he and Hemphill were probably the first to use corticotropic hormone in the treatment of human subjects, and published in 1942 the results of investigations carried out on a group of cases suffering from involutional melancholia (*J. ment. Sci.*, **88**, 559)." It is important that this correction should be made, as to suggest that I have treated rheumatoid arthritis is misleading.

Dr. T. M. Montford should have been described as part-time Medical Officer of Health to the Castle Donington Rural District Council in the *Journal* of November 12 (p. 1089).

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111 TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone. Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs.
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